Exhibit F1
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NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

IN RE GOOGLE PLAY STORE ANTITRUST LITIGATION THIS DOCUMENT RELATES TO: *In re Google Play Consumer Antitrust Litigation*, Case No. 3:20-cv-05761-JD *State of Utah et al. v. Google LLC et al.*, Case No. 3:21-cv-05227-JD	Case No. 3:21-md-02981-JD **CONSUMER AND STATE PLAINTIFFS' OPPOSITION TO DEFENDANTS' MOTION TO EXCLUDE MERITS OPINIONS OF DR. HAL J. SINGER** Judge: Hon. James Donato

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1   **Introduction**

2   Dr. Singer's merits expert report outlines the methodology he will use to demonstrate that

3   Google's conduct has harmed U.S. consumers. The market for Android App Distribution is two-sided,

4   connecting developers who sell apps to consumers who buy them through Google Play Billing. Dr.

5   Singer's methodology recognizes this economic reality and models the overcharges consumers have paid

6   through higher prices on both sides of the market. One model shows that Google's supracompetitive take

7   rate it charges developers has resulted in an overcharge in the form of higher app and in-app-content

8   prices for consumers. Another shows that the lack of competition has reduced the direct consumer

9   discounts that Google gives users, also resulting in an overcharge to the consumer side of the platform.

10 Depending on the form competition takes in the but-for world, Dr. Singer models consumer impact and

11 damages based on price impacts on either or both sides of the market.

12   Unlike at class certification, Google does not argue that any of Dr. Singer's models—the Rochet-

13 Tirole and Landes-Posner models used to calculate but-for take rates and consumer subsidies or the logit

14 model used to calculate pass-through—are not generally accepted in economics. Instead, Google focuses

15 its arguments solely on fit and on assumptions Dr. Singer made. Like at class certification, Google resorts

16 to mischaracterizing the record and Dr. Singer's testimony. Dr. Singer's methods reliably demonstrate

17 consumer impact and damages; Google's critiques should be addressed on cross examination before a

18 jury. Accordingly, just as this Court did at class certification, it should deny Google's motion.

19   **Background**

20   Dr. Singer has again authored a comprehensive expert report and reply report disclosing the

21 opinions he will offer at trial, including the same opinions regarding class-wide damages that were the

22 subject of Google's *Daubert* motion at class certification, which this Court denied. Ex. 1 (Singer Rpt.);

23 Ex. 2 (Singer Reply); Dkt. 252; Dkt. 271; *In re Google Play Store Antitrust Litig.*, No. 20-cv-5761, 2022

24 WL 17252587 (N.D. Cal. Nov. 28, 2022). Google focuses solely on Dr. Singer's analysis of antitrust

25 impact and damages, and does not challenge his qualifications or any other opinion. Dkt. 487 ("Mot.").

26 For the merits, Google has retained a new expert, Dr. Gregory Leonard, whose analysis, Ex. 3 (Leonard

27 Rpt.), repeats many of the mistakes made by Google's class certification expert.

28   Google Play is a two-sided market, with app developers on one side and consumers on the other.

1   Understanding the need to analyze both sides of the market, Dr. Singer models how Google's

2   anticompetitive conduct raised prices on both sides of the market, resulting in substantial overcharges.

3   **Overcharge from Google's Take Rate.** On one side of the market, Google extracts a supra-

4   competitive take rate from the prices consumers pay for developers' apps, resulting in higher prices. Ex.

5   1 (Singer Rpt.) ¶ 305. Dr. Singer uses two well-established models—the Rochet-Tirole Model (for the

6   two-sided Android App Distribution Market) and the Landes-Posner Model (for the one-sided In-App

7   Aftermarket)—to calculate the take rate Google would charge in the but-for world. *Id.* ¶¶ 305 (Table 6),

8   330 (Table 8). Google does not take issue with these models except to the extent pass-through is used as

9   an input. After calculating the competitive take rate, Dr. Singer ran extensive regressions on the full

10 available transactional data to determine the demand curves faced by developers. He then applied the

11 resulting pass-through formula to the transactional data to calculate the portion of Google's overcharge

12 borne by consumers in the form of higher prices. *Id.* ¶¶ 335-63.

13   **Overcharge from Consumer Discounts.** On the other side of the market, Google currently sets

14 a modestly negative price, by discounting consumer prices directly through a reward program called

15 Play Points and through other discounts. *Id.* ¶¶ 371-73. In the but-for world, consumer prices would be

16 lower because Google would offer more competitive consumer discounts to make the Play Store more

17 attractive to consumers. *Id.* ¶¶ 374-83. Dr. Singer models this overcharge in two ways. First, he uses the

18 same Rochet-Tirole Model, but calibrates it to solve for the but-for price on the consumer side of the

19 market. *Id.* ¶¶ 384-388 & Table 16. This model includes a built-in incumbency advantage for Google,

20 resulting in net discounts of ████ % in the but-for world. *Id.* ¶¶ 387, 420. Dr. Singer also uses real-world

21 consumer discounts in Amazon's Android app store as a benchmark. *Id.* ¶¶ 417-20. ██████████████

22 ██

23 ██████████████ *Id.* Tables 20-21. Google claims that "Dr. Singer could not say which of these widely

24 divergent estimates was more reliable." Mot. at 5. Not so. Put together, Dr. Singer's discount model and

25 Amazon model provide a range of possible overcharges in the but-for world, with the more conservative

26 discount model assuming a "durable incumbency advantage" in the but-for world, and the Amazon

27 model showing Google fully matching its competitor's discounts. Ex. 1 (Singer Rpt.) ¶ 420.

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1   **Overcharge on Both Dimensions.** Google accuses Dr. Singer of offering "a smorgasbord of

2   theories that are in tension with one another," Mot. at 1, but that misunderstands how Dr. Singer's models

3   work together. In the but-for world, competitors may enter by competing on the take rate, by directly

4   discounting prices to entice consumers to their stores, or by a mixture of both approaches. Ex. 1 (Singer

5   Rpt.) ¶ 371. Dr. Singer provides models for each of those three forms of competition given that each of

6   these approaches has been attempted in the actual world. Amazon has competed by offering significant

7   consumer discounts, focusing its competition mostly on the consumer side of the platform. *Id.* ¶¶ 417-

8   20. Aptoide, an app store based in Europe, has offered lower take rates seeking to attract developers. *Id.*

9   ¶ 311. The ONE Store in Korea has competed in both ways, offering lower take rates and consumer

10   discounts. *Id.* ¶ 308. Dr. Singer models the but-for world under each of those outcomes and allows the

11   jury to calculate damages based on its factual findings.

12   **Use of Google Data.** Google spends much of its brief deriding Dr. Singer for not directly

13   measuring changes in app prices after Google's limited take rate reductions. Dr. Singer did not employ

14   the "natural experiments" Google suggests because there was not enough variation in the data. Over 90%

15   of transactions from 2016 to 2021 took place at the 30% take rate. Ex. 4 (Hot Tub Tr.) at 60:1-4; Ex. 5

16   (Singer Class Reply) Fig. 1. And although Google has lowered its take rate for some transactions,

17   Google's anticompetitive restrictions remain in place, dampening developers' ability and incentives to

18   lower prices. For these reasons, the data lacks "the necessary basis for synthetic control analysis: a clean

19   control group … from which the Challenged Conduct is absent." Ex. 2 (Singer Reply) ¶ 39. Because

20   Google's challenged conduct has been in place for the entire existence of the market, "there is no pre-

21   existing or post-conduct time period to use for purposes of standard regression analysis." Ex. 1 (Singer

22   Rpt.) ¶ 280. Dr. Singer reasonably rejected the approach Google suggested he should have taken.

23   Moreover, Google's criticism ignores that Dr. Singer made extensive use of Google's

24   transactional data, both to determine the demand curve faced by developers and to directly measure pass-

25   through of *ad valorem* (i.e., percentage) costs. To determine the demand curve faced by developers, he

26   ran regressions across every single transaction in the database across the entire damages period, ranging

27   from August 16, 2016 to May 31, 2022. Ex. 1 (Singer Rpt.) ¶ 353. Dr. Singer also used corroborative

28   empirical evidence of pass-through by showing that higher tax rates—which like Google's take rate, are

1 an *ad valorem* cost—"are systematically passed on by developers to consumers in the form of higher

2 prices" across Google's voluminous transactional data. Ex. 2 (Singer Reply) ¶ 8.

3   **Dr. Leonard's Flawed Experiments.** Google claims Dr. Leonard's "multiple analyses of six

4 different data sets of IAPs at the SKU level, covering hundreds of products" shows little pass-through in

5 the real world, Mot. at 4, but ignores the significant flaws with those experiments. Dr. Leonard conducted

6 two types of analyses—a simple before and after price comparison for six overlapping sets of 100 SKUs,

7 and a "synthetic control" regression—on prices after Google reduced the take rate to 15% on the first $1

8 million in each developer's revenue in mid-2021. Ex. 3 (Leonard Rpt.) ¶¶ 36-54. While Dr. Singer used

9 almost six years of available data, Dr. Leonard analyzed less than a year's worth of data after the take

10 rate declined (July 2021 to May 2022). Ex. 2 (Singer Reply) ¶ 22; Ex. 3 (Leonard Rpt.) ¶¶ 36-54.

11   Both of Dr. Leonard's analyses relied on the same flawed SKU-level methodology of Google's

12 class certification expert. Ex. 2 (Singer Reply) ¶ 5; Ex. 5 (Singer Class Reply) ¶¶ 123-133. That

13 methodology's sole focus on individual SKUs is wholly unreliable because it misses the forest for the

14 trees, ignoring the actual products developers sell and the multiple ways developers can change prices.

15 *Id*.[1] Dr. Leonard's analyses of a narrow time period and transient reductions in take rate further

16 compound these issues, make his conclusions especially susceptible to price stickiness concerns, and do

17 not allow time for developers to internalize Google's limited take rate reductions. Ex. 2 (Singer Reply)

18 ¶ 23. And as described below, both of his analyses also suffer from significant additional flaws.

19   *First*, Dr. Leonard analyzed "six different data sets," Mot. at 4, that each contained only 100

20 SKUs. Ex. 3 (Leonard Rpt.) ¶¶ 36-43. These six sets of 100 SKUs—3 sets of in-app purchases and 3 sets

21 of initial app purchases—overlap significantly, meaning that Dr. Leonard analyzed fewer than 600 SKUs

22 (not products) in total. *See* Ex. 6 (Leonard Dep.) at 37:4-19. Dr. Leonard did not know how many SKUs

23 were in the full data set and acknowledged that some apps individually contain hundreds of SKUs for

24 in-app purchases. *Id*. at 39:13-15, 41:15-18. In total, the SKUs Dr. Leonard analyzed represented

25 "approximately ▮ percent of aggregate purchases" by Consumers over the period he studied. Ex. 2

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27   [1] Dr. Leonard claims to have ruled out some of these issues, Ex. 3 (Leonard Rpt.) ¶ 43 n.30, but he failed to take basic steps to analyze how developers use SKUs. For the SKUs he analyzed, he did not

28 determine whether other SKUs in the same app changed their price, and he did not even know what products the SKUs he analyzed represented. Ex. 6 (Leonard Dep.) at 47:11-16, 48:9-49:24.

1 (Singer Reply) ¶ 21. Because the take-rate reduction Dr. Leonard analyzed applies only to the first

2 million in developer revenue, many of the SKUs he analyzed experienced only fleeting take rate

3 reductions, sometimes for less than a month. Ex. 3 (Leonard Rpt.) ¶ 41 & Fig. 3. Moreover, Dr. Leonard

4 admitted that he does not know whether the SKUs he analyzed are "representative of all apps that

5 received a service fee reduction" and performed no analysis to determine if they were. Ex. 6 (Leonard

6 Dep.) at 59:19-61:4.[2] Nor did Dr. Leonard control for whether any factors aside from the service fee

7 reduction affected the price of the SKUs he analyzed. *Id.* at 47:17-48:2. Dr. Leonard also failed to adjust

8 for inflation, even though the time period featured significant inflation. Ex. 2 (Singer Reply) Figs. 1-3.[3]

9   *Second*, Dr. Leonard ran a "synthetic control" regression, comparing developers whose take rate

10 remained the same (control group) to those who received a reduction in July 2021 (treatment group). Ex.

11 3 (Leonard Rpt.) ¶¶ 47-54. His treatment group included only *one percent* of transactions over that

12 already limited period. Ex. 2 (Singer Reply) ¶¶ 35, 38. The treatment group contained developers making

13 significantly less revenue (averaging $█████ per year) than those in his control group (averaging $██

14 ██████ per year). *Id.* ¶ 37. Due to these and other issues, Dr. Leonard's analysis produced nonsensical

15 results. His analysis was unable to determine the sign, let alone the magnitude, of the pass-through rate,

16 so he arbitrarily used the extreme upper bound of the 95% confidence interval from his regression

17 analysis to calculate his 3% pass-through rate. *Id.* ¶ 39; Ex. 3 (Leonard Rpt.) ¶ 51.

Argument

I.   Dr. Singer's Pass-Through Analysis Is Reliable

20   Dr. Singer's pass-through analysis, which is grounded in extensive empirical work, is reliable.

21 Google now appears to concede that the "logit model is sometimes used for other kinds of antitrust

22 analyses." Mot. at 6. As such, Google does not argue that Dr. Singer's method is not "generally

23 accepted," which is a "key factor" in the *Daubert* analysis. *See Milan v. Clif Bar & Co.*, 340 F.R.D. 591,

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[2] Dr. Leonard declined to analyze any subscription SKUs except for Tinder in his "real-world analysis" because "[i]t's really just that its subscriptions are a little bit messier because there was the January 2018 change, so that's the real reason." Ex. 6 (Leonard Dep.) at 61:21-62:14.

[3] Dr. Leonard claims to rule out inflation because he found "no statistically significant relationship" between inflation and Android app prices. Ex. 3 (Leonard Rpt.) ¶ 38 n.14. But Dr. Leonard's finding of no relationship is equally consistent with pass-through of savings in real dollar values as inflation increased, just as Dr. Singer's analysis showed. Ex. 7 (Singer Merits Dep.) 133:12-18.

601 (N.D. Cal. 2021); *see also* Ex. 1 (Singer Rpt.) ¶ 348 n.809. Google instead focuses its arguments on fit, arguing that "Plaintiffs have the burden to show that Dr. Singer's formula in *this case* is reliable." Mot. at 6. As an initial matter, Dr. Singer's application of logit is directly analogous to the merger context—the objective is to map a change in costs onto a change in price. *See* Ex. 4 (Hot Tub Tr.) at 61:18-20. More specifically, none of the factors Google identifies undermine the fit of Dr. Singer's methods to this case, or the logit model's fit to Google's transactional data.

A.   Logit Reliably Models Demand for Each of Google's App Categories.

Google argues that "[i]f logit does not reliably model user demand, then Dr. Singer's formula derived from logit is not reliable." Mot. at 6. Neither Google nor its experts argue that another demand curve fits the facts of this case better.[4] Instead, Google focuses solely on whether the logit demand system's property of proportional substitution (also known as "independence of irrelevant alternatives" or "IIA") is satisfied. Proportional substitution means that when prices for one product increase, consumers switch to substitutes in proportion to their relative shares. The facts support the use of proportional substitution, and logit models can reliably measure pass-through even if proportional substitution does not perfectly hold.

First, Dr. Singer has demonstrated that logit does reliably model user demand, and Google does not present any reliable evidence showing otherwise. Dr. Singer's regressions show that logit "explain[s] over 95 percent of the variation in consumer demand in the voluminous Google transaction data." Ex. 2 (Singer Reply) ¶ 7. For each of the Play Store's categories, Dr. Singer finds a negative and highly statistically significant relationship between price and share within that category. Ex. 1 (Singer Rpt.) ¶ 354. Dr. Singer has also tested logit against alternative models. Ex. 2 (Singer Reply) ¶ 51 & Appendix 3; Ex. 7 (Singer Merits Dep.) 114:18-116:5. Dr. Singer's use of standard econometric methods to confirm logit's fit is "standard practice in empirical antitrust work," wherein "the form of the demand curve is

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[4] Google's only passing effort to suggest another demand model would work is by noting that Dr. McFadden used log-linear demand rather than logit demand in the Apple litigation. Mot. at 8 n.3. But the fact that Dr. McFadden used a different model—while using the same app categories to calibrate his model—is of no matter. Dr. McFadden concedes that his log-linear equations are meant only to "approximate consumer demand" (in the market for iOS apps, not Android apps) and there is no indication that Dr. McFadden tested (let alone rejected) logit demand. *In re Apple iPhone Antitrust Litig.*, No. 4:11-cv-6714-YGR (N.D. Cal.), Dkt. 643-11 at 151, Appendix D, ¶ 7.

assessed based on 'how well the model fits the observable data.'" Ex. 2 (Singer Reply) ¶ 7 (quoting Ex. 8 (Luke Froeb et al., *Economics at the Antitrust Division: 2017–2018*, 53 Review of Industrial Organization 637, 640 (2018))).

"[T]he logit model makes a very specific prediction about the relationship between an app's share within its category and its price," and Dr. Singer's regressions confirmed that relationship. Ex. 4 (Hot Tub Tr.) at 81:21-82:22. As Dr. Singer testified, "once you know that the model fits and is the best demand system for the data, you can infer that users are moving around the category in proportion to the market share." Ex. 7 (Singer Merits Dep.) 188:10-15. Google seeks to cast doubt on Dr. Singer's empirical analysis—even though it has not moved to exclude it—by truncating Dr. Singer's deposition testimony to suggest his methods are unsupported. Mot. at 9 (quoting excerpts of Singer Merits Dep.). The full answer Google omits shows that "goodness of fit will tell you if the Logit is … the relevant way to describe preferences in substitution patterns here." Ex. 7 (Singer Merits Dep.) at 104:12-105:6, 105:23-106:8.[5]

In contrast to Dr. Singer's data analysis, which confirms that logit describes demand within each app category well, Google relies solely on anecdotal argument. Dr. Leonard has not performed any empirical analysis of substitution. Ex. 3 (Leonard Rpt.) ¶ 66. Nor has Google identified any alternative analysis Dr. Singer could have performed.[6] Lacking empirical support, Google argues that "just one" example will do, highlighting QuickBooks Online Accounting, an accounting app, and Thumbtack, an app that connects consumers to professionals. Mot. at 9. But even Google's one example fails because

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[5] Dr. Rysman's testimony which Google cites, Mot. at 9 n.4, simply says that "negative correlation between price and demand" would "[n]ot by itself" indicate that "the logit model was appropriate." Ex. 9 (Rysman Dep.) 68:21-69:2. Dr. Rysman had not read Dr. Singer's report. *Id.* at 42:21-25.

[6] No expert in this case has applied the statistical test for logit developed by Hausman and McFadden, given that it is not applicable here. Ex. 7 (Singer Merits Dep.) 86:17-87:6, 96:12-20, 103:19-104:11. Logit is commonly used without applying that test. *See, e.g.*, Ex. 10 (Frank Verboven & Theon van Dijk, *Cartel Damages Claims and the Passing-on Defense*, 57(3) Journal Of Industrial Economics 457, 457-91 (2009)) (Hausman-McFadden test not mentioned in article using logit to measure pass-through from cartel); Ex. 8 (Froeb 2018) (Hausman-McFadden test not mentioned in discussion of DOJ economists' use of logit, nor offered in the accompanying antitrust software manual, available at: https://cran.r-project.org/web/packages/antitrust/antitrust.pdf); Ex. 11 (Frank Verboven, *International Price Discrimination in the European Car Market*, 27(2) RAND Journal of Economics 240, 240-68 (1996)) (Hausman-McFadden test not mentioned in logit analysis of European auto pricing).

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1 QuickBooks and Thumbtack are substitutes. Thumbtack includes professional listings for "Accountant,"

2 "Small Business Accounting," and "Business Accounting," which a user could employ rather than

3 buying QuickBooks. Ex. 12 (Thumbtack Webpage Excerpts).

4 Substantial record evidence likewise supports that Google's app categories meaningfully

5 organize substitution. Google dismissively says that its "maintenance of the categories says nothing

6 about substitution between apps," Mot. at 9, but ignores that it does more than just maintain the

7 categories. Evidence shows that the Play Store's categories are not "haphazardly assigned or done

8 without any kind of economic logic." Ex. 7 (Singer Merits Dep.) 90:11-12. Google tells developers that

9 "[c]ategories and tags help users to search for and discover the most relevant Apps," Ex. 1 (Singer Rpt.)

10 ¶ 349 (citation omitted), and uses the categories for its own internal analyses of consumer spending and

11 discovery. *E.g.*, Ex. 13 (GOOG-PLAY-000579868.R) at -870.R; Ex. 1 (Singer Rpt.) ¶¶ 349-51

12 (compiling Google and external analyses that use app categories). The categories represent economically

13 reasonable groupings of consumer tastes for different varieties of Apps. Ex. 1 (Singer Rpt.) ¶ 349.

14 *Second*, even accepting Google's inaccurate factual contentions, Google's premise that logit fails

15 if even one app in a category is not a substitute is false. Logit "does not imply that all products in the

16 market are perfectly interchangeable, but instead allows for product differentiation." Ex. 1 (Singer Rpt.)

17 ¶ 351 (citing peer-reviewed literature). As Dr. Singer testified, even if proportional substitution does not

18 hold for *every* app, the logit model would still be reliable, because "[i]n any econometric model … we

19 make all sorts of demands on the nature of the error terms in the model, just as we do here." Ex. 7 (Singer

20 Merits Dep.) 89:20-90:16. Even if proportional substitution is not strictly satisfied, an economist may

21 "use the logit model … considering the model to be an approximation." Mot. Ex. 8 (Train, *Logit*) at 36.

22 For this reason, Google's excerpts of testimony suggesting Dr. Singer concedes that not all apps

23 in a given category are perfect substitutes get it nowhere. In each case, Dr. Singer noted that even if each

24 app is not a perfect substitute, the model provides a reasonable estimation of competition within the

25 category. *See* Ex. 14 (Singer Class Dep.) at 158:6-160:1; Ex. 4 (Hot Tub Tr.) at 116:13-117:21

26 (categories "are a meaningful arena of competition around which one can use for estimating shares for

27 the logit model").

28 Neither Google's brief nor its economist cite any literature for the proposition that cherry-picked

examples of apps that are not perfect substitutes within a category undermine pass-through estimates. Ex. 3 (Leonard Rpt.) ¶ 72 n.76; *see also id.* ¶ 153 (arguing only that "IIA restrictions on substitution patterns can be especially misleading in the context of new product introduction"). As Dr. Singer has explained, logit does not require that all apps within a category are substitutes from the perspective of all consumers. Ex. 7 (Singer Merits Dep.) 78:17-21. Meanwhile, Dr. Singer has cited extensive literature showing that logit is widely used to estimate pass-through in a variety of contexts.[7]

Google's citations concerning unrealistic "forecasts" from the logit model concern an entirely different application of logit. Each concerns the reliability of forecasting consumer substitution when new or different products are introduced. *See* Mot. Ex. 9 (McFadden, *Economic Choices*) at 357-58 (logit gives "an easy formula for forecasting demand for new alternatives"); Mot. Ex. 8 at 47-48 (discussing non-proportional substitution from small and large gas cars to small electric cars). As Dr. Singer explained: "the forecast that McFadden [the author of Mot. Ex. 9] has in mind here are forecasts that are made from the parameters of the Logit model after it's estimated, right. I'm not making any such forecast. That's not what I'm using it for." Ex. 7 (Singer Merits Dep.) 418:17-419:20. Put differently, Dr. Singer's pass-through model does not rely on forecasting consumer substitution to new or different products; consumers make the *same purchases* at lower prices after take rates fall across the board.

B.   Dr. Singer Accounted for Focal Point Pricing

Google's argument that Dr. Singer fails to consider focal point pricing fails for two basic reasons. Google has not shown that focal point pricing will affect pricing in the but-for world, and Google ignores that Dr. Singer's methodology can account for focal point pricing.

First, there is very little evidence that focal point pricing would dictate pricing in the but-for world. Dr. Singer presented significant evidence that developers can and do depart from 99-cent focal point intervals. Ex. 1 (Singer Rpt.) ¶ 405. For example, Google previously mandated a 99-cent price

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[7] *See, e.g.*, Ex. 1 (Singer Rpt.) ¶ 356, nn.835-37; Ex. 15 (Nathan Miller, et al., *Pass-Through and the Prediction of Merger Price Effects*, 64(4) JOURNAL OF INDUSTRIAL ECONOMICS 683, 693 (2016)) (Table 1 shows pass-through estimates for logit); Ex. 10 (Verboven & van Dijk 2009) (using logit to analyze the extent to which direct purchasers overcharged by the European vitamin cartel would pass on the overcharges to indirect purchasers.); Ex. 16 (K. Sudhir, *Structural Analysis of Manufacturer Pricing in the Presence of a Strategic Retailer*, 20(3) MARKETING SCIENCE 244, 249-51 (2001)) (using logit to analyze pass-through of wholesale supermarket prices into retail prices paid by consumers).

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1 floor; approximately ▮% of developers reduced their prices below 99-cents within the first year that

2 restriction was lifted. Ex. 1 (Singer Rpt.) ¶ 406; Ex. 7 (Singer Merits Dep.) at 121:16-122:2. Google's

3 evidence of the importance of 99-cent focal point intervals is limited to one footnote in Dr. Leonard's

4 report, Ex. 3 (Leonard Rpt.) ¶ 32 n.7, even as Dr. Leonard elsewhere argues that "there are *many* different

5 price points across apps" and that "there are rarely two apps that have the same price," *id*. ¶ 142 & Figs.

6 14-17. Dr. Singer thus reasonably concluded that "the prospect of focal point pricing getting in the way,

7 even for those [developers] who care about it … of a price reduction is … remote." Ex. 7 (Singer Merits

8 Dep.) 122:3-123:3.[8] Here there is no "overwhelming evidence" suggesting that "developers would

9 choose to price their apps at focal points ending in 99 cents." *In re Apple iPhone Antitrust Litig.*, No. 11-

10 cv-6714-YGR, 2022 WL 1284104, at *8 (N.D. Cal. Mar. 29, 2022). There is little reason for Dr. Singer

11 to account for focal point pricing in his models on this record.

12   *Second*, even if focal point pricing would guide but-for world pricing, Dr. Singer has empirically

13 demonstrated that his model can accommodate it. Ex. 1 (Singer Rpt.) ¶¶ 407-13. In short, Dr. Singer's

14 model can be modified such that the developer reduces the price to the nearest focal point interval, rather

15 than precisely to the but-for profit-maximizing price. *Id*. ¶¶ 411-12. Using 10-cent focal point intervals,

16 which Dr. Singer notes are common in Google's transactional data, adjusting for focal point pricing

17 resulted in only ▮% of transactions not seeing a price decrease in the but-for world. *Id*. ¶¶ 407, 413.

18 Dr. Singer demonstrated that his model can be mechanically adjusted to account for focal point pricing.

19   **C.   Dr. Singer Accounted for Developers' Costs**

20   Dr. Singer's pass-through calculations account for developers' other marginal costs beyond the

21 take rate. The initial equations from which the standard logit pass-through formula was derived include

22 a term for developers' marginal costs. *See* Ex. 17 (Nathan Miller, et al., *Using Cost Pass-through to*

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[8] Google selectively quotes Dr. Singer's testimony and outright mischaracterizes Dr. Rysman's testimony on focal point pricing. Google's claim that Dr. Singer concluded that "focal point pricing is an important consideration here" takes that exchange out of context, and any implication that Dr. Singer did not consider it is belied by his report and other deposition testimony. *See* Ex. 7 (Singer Merits Dep.) at 121:8-15; Ex. 1 (Singer Rpt.) ¶¶ 405-06; Ex. 2 (Singer Reply) ¶ 8 n.21. Google claims Dr. Rysman conceded that "some firms would not change price in response to a change in the commission rate." Mot. at 2 (quoting Rysman Dep.). Dr. Rysman said that would be the case "[i]f focal point pricing is important," but then testified "I didn't study that issue." Ex. 9 (Rysman Dep.) at 62:16-63:15.

1   *Calibrate Demand*, 118 ECONOMICS LETTERS 451, 452-453 (2013)). As Dr. Singer testified, when "you

2   look at the most common functional forms [of demand curves,] [y]ou'll often see that marginal cost

3   drops out of the pass-through equation." Ex. 7 (Singer Merits Dep.) 147:9-17. In short, standard

4   economics shows that knowledge of developers' *other* marginal costs is not necessary to calculate pass-

5   through.

6   Google cites only Dr. Leonard's report and selections of Dr. Singer's deposition to say he should

7   have done more to account for those costs. But Dr. Leonard cites no literature in support of his claim,

8   Ex. 3 (Leonard Rpt.) ¶ 32 & n.7; Ex. 6 (Leonard Dep.) at 104:23-105:6, and relies solely on his own

9   calculations that do not appear in any literature, Ex. 6 (Leonard Dep.) at 106:5-110:3. Google also repeats

10 its false claim from class certification that "Dr. Singer concedes that pass-through of a service fee will

11 be proportional to the developer's other marginal costs." Mot. at 2; Dkt. 252 at 7. That testimony

12 concerns a separate equation which cannot be used—and that no expert has suggested could be used—

13 to calculate pass-through. Ex. 14 (Singer Class Dep.) at 105:8-109:14. Google's citation omits the middle

14 of the quoted exchange, where Dr. Singer specifies that "when I go to model the precise amount of pass-

15 through," it "takes me to a pass-through rule that isn't necessarily going to be denominated in terms of

16 costs." *Id.* at 107:8-22. As noted above, other marginal costs drop out of the equation once a demand

17 curve is applied. Ex. 17 (Miller 2013) at 452-53. Google has no support for its suggestion that Dr. Singer

18 needs to determine every developer's exact level of other marginal costs to determine pass-through.[9]

19   **D.   Dr. Singer Used Extensive Available Data**

20 Finally, Google argues that Dr. Singer has not "conducted any statistical analysis" of pass-

21 through and instead "has chosen a formula to guarantee it." Mot. at 11-12. Again, Google is wrong—

22 Dr. Singer used data at every step of his analysis. Dr. Singer did not simply "choose" the logit formula—

23 he ran regressions across Google's transactional data to confirm that logit described the demand faced

24 by app developers better than other demand curves. Ex. 2 (Singer Reply) ¶ 7 & n.19. This case is nothing

25 like *Sidibe v. Sutter Health*, 333 F.R.D. 463 (N.D. Cal. 2019), where the expert simply assumed 100%

26 pass-through based on one document in the record. *Id.* at 497. Dr. Singer also used Google's transaction

27

28   [9] Indeed, doing so would be impossible—Dr. Leonard testified with respect to each developer's
    marginal costs: "I just don't think that information is available." Ex. 6 (Leonard Dep.) at 87:13-88:7.

1   data to confirm that developers pass through *ad valorem* taxes (similar to the take rate here) in the form

2   of higher prices. Ex. 2 (Singer Reply) ¶ 8. Finally, Dr. Singer engaged with, and extensively rebutted,

3   Dr. Leonard's use of Google's transaction data. *Id.* ¶¶ 19-39.

4   In fact, Dr. Leonard has employed similar methods to Dr. Singer's work in the past. Dr. Leonard

5   represented the merging companies in FTC proceedings related to the merger of Staples and Office

6   Depot. Ex. 18 (Jerry Hausman & Gregory Leonard, *Efficiencies from the Consumer Viewpoint*, 7(3)

7   GEO. MASON L. REV. 707, 726 (1999) (PX-2853)). There, the FTC conducted an empirical study and

8   found that only 21% of cost savings from the merger would be passed on to consumers. *Id.* Dr. Leonard

9   criticized this empirical estimate as "implausibl[e]" suggesting the FTC's "estimates were downward

10 biased, e.g., because of measurement error." *Id.* at 726 n.47. Dr. Leonard found that the "[demand]

11 curvature implied by the Staff's pass-through estimate" was "quite unlikely to hold in practice." *Id.* at

12 726. Dr. Leonard concluded that "[t]he knowledge that at least 50 percent of the cost savings will be

13 passed on to consumers could have a significant effect on the Agencies' evaluations of merger[s].*" Id.*

14 at 727. Put simply, Dr. Leonard concluded that an analysis like Dr. Singer's—using the demand curve

15 to derive a pass-through rate—was more reliable than an empirical analysis of a subset of data—as Dr.

16 Leonard did here.

17   At bottom, Google's argument is not that Dr. Singer ignored available data, it is that his use of

18 the data and analysis draws conclusions Google doesn't like. Disagreement with the *output* of an expert's

19 methodology is no grounds for exclusion. *Elosu v. Middlefork Ranch Inc.*, 26 F.4th 1017, 1024 (9th Cir.

20 2022) ("Ultimately, the test under *Daubert* is not the correctness of the expert's conclusions but the

21 soundness of his methodology." (quotation marks and citation omitted)).

22   **II.   Dr. Singer's Consumer Subsidy Overcharge Models Are Admissible and Reliable**

23   Google argues that Dr. Singer's consumer subsidy models are both inadmissible for the class and

24 unreliable. Neither argument has merit. As a preliminary matter, that the Court did not rely on the model

25 at class certification is of no matter. *Comcast Corp. v. Behren* stands for the proposition that damages

26 must be connected to "the particular antitrust injury on which [defendant's] liability in this action is

27 premised." 569 U.S. 27, 36 (2013). Unlike in *Comcast*, each of Dr. Singer's damages models flow from

28 the same theory of antitrust impact—that Google's conduct has blocked competitors from the Android

1   App Distribution Market and In-App Aftermarket resulting in higher consumer prices—but models that

2   price impact on separate ends of the market. *See Krueger v. Wyeth, Inc.*, 310 F.R.D. 468, 482 (S.D. Cal.

3   2015) ("[u]nlike the situation in *Comcast*, there is no possibility in this case that damages could be

4   attributed to defendants' acts that are **not** challenged on a class-wide basis"). There is no *Comcast* issue

5   because both models flow from the same theory of liability. And, of course, Dr. Singer may present his

6   other models on behalf of the States and individual consumers.[10]

7   Dr. Singer's calculations of overcharge damages based on discounts are also reliable. The

8   discount model is built upon the same Rochet-Tirole model that Google does not challenge, with the

9   exception of some inputs. The Amazon model is built on a reliable benchmark of the real-world entrant

10 that has chosen to compete with consumer discounts.

11   **A.**   **Dr. Singer's Discount Model Is Reliable**

12   Google raises two issues with Dr. Singer's discount model: (1) that he failed to analyze Play

13 Points participation rates with specificity, and (2) that he used unreliable economic data for one input.

14 Both criticisms are at best grist for cross-examination and do not merit exclusion of his testimony at trial.

15   *First*, Dr. Singer relied on substantial record evidence to conclude that the discounts Google

16 provides consumers in the but-for world would benefit all or nearly all consumers. About ███████ of

17 consumers have already signed up for Play Points today, even though the Play Points subsidy "is

18 ██████████████ right now." Ex. 14 (Singer Class Dep.) 293:21-294:9; 298:4-21. In a more competitive

19 world, Google would have clear economic incentives to automatically provide discounts to users, or at

20 least to minimize enrollment costs, so "they would not be so prohibitive as to allow [a but-for] rival to

21 eat their lunch." Ex. 7 (Singer Merits Dep.) 168:19-169:7. Substantial record evidence shows that even

22 modestly higher discounts lead to widespread enrollment. Ex. 1 (Singer Rpt.) ¶¶ 371-383; Ex. 19 (AMZ-

23 GP_00002484) at -488 (greater than 90% usage of Amazon coins); Ex. 20 (GOOG-PLAY-

24 000004957.R) at -969.R ("spend coverage of █ percent" for Play Points ██████ within just one year).

25 _____

26   [10] Google also claims Dr. Singer opined that the model only addresses "aggregate damages," but as
Dr. Singer explained shortly after: "for a given member of the class, you could estimate what the

27 reduction in – in his or her net payments would be relative to what they spent in the actual world." Ex.
7 (Singer Merits Dep.) at 164:17-166:14; *see also id.* at 172:7-12 ("Q: And if I – again, if I took a user

28 at random from the – from the data on the users of the Google Play Store, could your Amazon Coins
model tell me whether – how much in subsidy that consumer would have received? A: Yes.").

1   Dr. Singer relied on that evidence to conclude that "a safe inference is that all or almost all consumers

2   will avail themselves of that option." Ex. 7 (Singer Merits Dep.) 167:11-25. Google has not shown why

3   he must do more to account for low participation rates that flow from current meager discounts, an

4   artifact of Google's conduct. *See In re Mushroom Direct Purchaser Antitrust Litig.*, No. 06-0620, 2015

5   WL 5767415, at *6 (E.D. Pa. July 29, 2015) (reliable method "may properly include making assumptions

6   so long as those assumptions are sufficiently grounded in available facts" (citation omitted)).

7   *Second*, Google criticizes one of the inputs to the discount model. Dr. Singer made a reasonable

8   economic choice in relying on peer-reviewed literature studying AT&T as its market share declined to

9   60% with competition to calculate the but-for price elasticity. Ex. 1 (Singer Rpt.) ¶ 386 n.920. Economic

10 models are not industry-specific; what matters are similarities in competitive dynamics—AT&T is a

11 prime example of a platform monopolist, benefitting from network effects, that leveraged monopoly

12 power into an ancillary market, before being forced to open the market to competition. *See id.* ¶ 331; Ex.

13 2 (Singer Reply) ¶ 42. If Google's criticism is that a higher tech benchmark is necessary, Dr. Singer also

14 provided several other benchmarks which result in a *lower* but for market share—and *higher* damages—

15 demonstrating that his use of AT&T was conservative. *Id.* ¶¶ 43-46 (analyzing post-monopolistic market

16 shares of Netflix (25%), IBM (24.6%), and Internet Explorer/Edge (4%)). Neither Google nor Dr.

17 Leonard have proposed an alternative benchmark or calculated an alternative but-for market share.

18   *Finally*, the precise value of Google's but-for market share does not "dramatically" affect Dr.

19 Singer's model as Google suggests. Mot. at 13. Changes to this single input result in only minor changes

20 in the model's predictions. Ex. 7 (Singer Merits Dep.) 151:24-153:4; *see also* Ex. 2 (Singer Reply) ¶ 49.

21 Thus, even if the AT&T benchmark is not precise, it does not significantly impact the results. In any

22 case, criticisms of an input are grounds for cross-examination, not exclusion. *See Victorino v. FCA US*

23 *LLC*, No. 16-cv-1617-GPC, 2018 WL 2767300, at *3 (S.D. Cal. June 7, 2018) ("[u]nder Rule 702 and

24 Daubert, the proper analysis is not whether some of the inputs can be questioned" (citation omitted)).

B.   Dr. Singer's Amazon Model Is Reliable

26   Finally, Dr. Singer's Amazon Model is a reliable alternative measure of overcharge to consumers,

27 based on a benchmark of Google's most prominent worldwide competitor that courted consumers with

28 discounts. Google's arguments to the contrary are merely cross examination points.

1   *First*, as with the discount model, Dr. Singer's Amazon model can calculate individual damages.

2   The discount derived from the model can be mechanically applied to each consumer's purchase history,

3   just as with the other models. *See* Ex. 7 (Singer Merits Dep.) 171:22-172:12.

4   *Second*, the discounts Amazon provides to consumers on Android devices are a reliable

5   benchmark for Google's consumer subsidies in a but-for world where it would have been forced to

6   compete for consumers directly by lowering app prices. The Amazon app store is the only available

7   benchmark (1) of a store competing in the Android App Distribution Market through use of consumer

8   discounts; (2) of a rival with Amazon's stature; (3) with record evidence indicating a sustained attempt

9   at robust competition on Google Android devices; and (4) with available data revealing the magnitude

10 of discounts actually received by consumers in the actual world. Ex. 1 (Singer Rpt.) ¶¶ 198-200, 417-20.

11 While other app stores on Android may meet some of those points, Google has not identified any

12 alternative benchmark that meets these (or similar) criteria. For example, while ONE Store offered

13 consumer discounts in Korea, it does not have the same worldwide reach as Amazon, and data

14 quantifying its discounts is not available. *Id.* ¶¶ 308, 377; Ex. 7 (Singer Merits Dep.) 181:18-182:11.[11]

15 This is not a situation like *In re Apple iPhone Antitrust Litig.*, 2022 WL 1284104, at *3-4, where an

16 expert "cherry-picked" one of many benchmark candidates from a different market.

17 Google also complains that Amazon offers its discount (coins) in a different form than Google

18 offers its discounts (points) in the actual world. But it does not explain why that makes Amazon a less

19 effective benchmark—██

20 ██████████████████ The relevant economic question is the total discounts consumers would receive,

21 and a competitor could sustain, in the face of competition. Ex. 2 (Singer Reply) ¶ 56. In a competitive

22 market, Google would have the incentive to not only match those discounts, but to provide them in either

23 the same form, or in a form that is just as valuable to consumers, so that it could effectively compete.

Conclusion

25 For the foregoing reasons, Google's motion to exclude Dr. Singer's testimony should be denied.

---

27 [11] Google claims that Dr. Singer did not "analyze whether any other app stores that his report identifies as potential benchmarks" would be a better fit. Mot. at 15. But the testimony Google cites *does* analyze

28 ONE Store, and the other items in that table, with the exception of Aptoide, are not Android app stores. Ex. 7 (Singer Merits Dep.) 181:18-183:5 (referencing Table 7 of Ex. 1, Singer Rpt.)

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CONSUMER AND STATE PLAINTIFFS' OPPOSITION TO DEFENDANTS' MOTION TO EXCLUDE MERITS OPINIONS OF DR. HAL J. SINGER, Case Nos. 3:21-md-02981-JD; 3:20-cv-05761-JD; 3:21-cv-05227-JD

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E-FILING ATTESTATION

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4

I, Karma M. Giulianelli, am the ECF User whose ID and password are being used to file this document. In compliance with Civil Local Rule 5-1(h)(3), I hereby attest that each of the signatories identified above has concurred in this filing.

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/s/Karma M. Giulianelli

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Karma M. Giulianelli

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Exhibit F2
Public Redacted Version

FILED UNDER SEAL

Exhibit 7

ATTORNEYS' EYES ONLY

Page 1

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 1              UNITED STATES DISTRICT COURT
              NORTHERN DISTRICT OF CALIFORNIA
 2                SAN FRANCISCO DIVISION
 3
    IN RE GOOGLE PLAY STORE    :  Case No.
 4  ANTITRUST LITIGATION       :  3:21-md-02981-JD
                               :
 5                             :
    This Document Relates To:  :
 6                             :
    State of Utah et al. v.    :
 7  Google LLC et al.          :
    Case No. 3:21-cv-05227-JD  :
 8                             :
    Match Group, LLC et al. v. :
 9  Google LLC et al.          :
    Case No. 3:22-cv-02746-JD  :
10                             :
    Epic Games Inc. v. Google  :
11  LLC et al.                 :
    Case No. 3:20-cv-05671-JD  :
12                             :
    In Re Google Play          :
13  Consumer Antitrust         :
    LItigation                 :
14  Case No. 3:20-cv-05761-JD  :
15
16          ** ATTORNEYS' EYES ONLY **
17             TUESDAY, APRIL 4, 2023
18
19          Video Recorded and Remote Zoom
      Deposition of HAL J. SINGER, Ph.D., taken
20    pursuant to Notice, at the law offices of
      Munger, Tolles & Olson LLP, 601 Massachusetts
21    Avenue NW, Washington, DC, commencing at
      approximately 9:11 a.m., on the above date,
22    before Rose A. Tamburri, RPR, CM, CCR, CRR,
      USCRA Speed and Accuracy Champion and Notary
23    Public.
24
25
```

ATTORNEYS' EYES ONLY

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1   Q.   Have you done any study of why

2   developers pick one category over the other

3   for their apps?

4   A.   Well, I've studied which ones they've

5   picked, and I think that it's -- it's a fairly

6   safe economic inference that you would want to

7   pick the category that most naturally contains

8   the type of app that you're selling; in other

9   words, it would be disorienting to a consumer

10   if you were one type of app, let's say a

11   children's app, and put yourself in the

12   Productivity category, you wouldn't be

13   discovered; they would engender confusion.

14   So I feel like there's a lot of --

15   if makes a lot of sense, and I feel like we

16   should -- we should attach a lot of economic

17   meaning to the decisions that the individual

18   apps made when they self-selected the

19   categories.

20   Q.   A developer's selection of a

21   category, in your view, says something about

22   their marketing decision?

23   A.   Not only their marketing decision,

24   but how they see themselves in the contours

25   of -- of competition with other apps.

ATTORNEYS' EYES ONLY

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1   Q.   Do you agree that if Google's app

2   categories are not reliable to use with the

3   Logit model, then your model is not reliable?

4   A.   I don't think I'd -- I don't think

5   I'd go that far. It is -- it is important

6   that the categories have economic meaning, but

7   I also have faith in the model because it's

8   the most widely used model for pass-through in

9   economics and application in antitrust, but

10   also because the fit is so good.

11   So I feel like there are -- there

12   are several independent legs or bases on which

13   the model rests, and you're -- you're taking

14   away an important one, but I don't think that

15   the model necessarily falls because of it.

16   Q.   Okay.

17   Now, it's not your opinion that

18   every app in every category is a substitute

19   for every other app in that category?

20   A.   Not from the perspective of every

21   consumer, but from the perspective of at least

22   some consumers, I do think that everything

23   would meet that -- would meet that criteria.

24   Q.   Okay.

25   But some apps in each category are

ATTORNEYS' EYES ONLY

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 1    Logit model is known as the independence of a
 2    relevant alternative's property?
 3         A.    Yes.
 4         Q.    And the independence of a relevant
 5    alternative's property says that all products
 6    being studied in the Logit model should be
 7    substitutes in proportion to their share?
 8         A.    I think that's fair.
 9         Q.    Okay.
10              Now, if the indepen -- indepen --
11    if the -- well, let's back up.
12              Can we call it the independence of
13    a relevant alternative's property IIA?
14         A.    Sure.
15         Q.    Okay.
16              And if the IIA assumption is not
17    satisfied in the Logit model, then the Logit
18    model can lead to unrealistic forecasts; is
19    that right?
20         A.    I'm not going to say so necessarily.
21    I think that it could produce estimates that
22    are different than the true parameters that
23    you're hoping to estimate, but I think the
24    word that you used was unreliable?  And I
25    felt --
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1   Q.   Well --

2   A.   -- I felt like that was too harsh.

3   Q.   Well, let me just ask you this:

4   Does your Logit model satisfy the

5   IIA property?

6   A.   I believe it does, yes.

7   Q.   And if your Logit model does not

8   satisfy IIA, would that lead you to have any

9   concern that its forecasts are unrealistic?

10   A.   Well, it would depend on -- on how

11   badly these assumptions were violated. So I

12   think that they're not. I think that the --

13   the groupings here were economically

14   reasonable. These are not my groupings; these

15   are Google's groupings that are then

16   self-selected by the -- by the apps.

17   And there are tests for IIA, I

18   think Haus -- Hausman and maybe McFadden have

19   developed a test. It's -- it has its flaws as

20   well. Those tests are not feasible here

21   because we don't have consumer level data.

22   We're -- we're just seeing the apps shares.

23   So we'd have to drop the entire app out of the

24   dataset, in which case you'd get the same

25   findings, and so you'd always affirm the IIA.

ATTORNEYS' EYES ONLY

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1   Your experts, of course, didn't

2   show that IIA wasn't satisfied through those

3   tests either, which I think is confirmation

4   that we can't do those tests. But I feel

5   confident the IIA is reasonably satisfied

6   here.

7   MS. GIULIANELLI: We can -- you

8   can continue on, but at some point, let's take

9   a break. We're -- I don't want to interrupt

10   your --

11   MR. RAPHAEL: I'm happy to take a

12   break now.

13   THE WITNESS: Great.

14   THE VIDEOGRAPHER: Going off

15   record, the time is 10:37.

16   (Whereupon, a recess was taken at

17   the above time.)

18   THE VIDEOGRAPHER: Going back on

19   the record. The time is 10:47.

20   BY MR. RAPHAEL:

21   Q.   Dr. Singer, is it your opinion that

22   Google established the categories in the Play

23   Store with the IIA property in mind?

24   A.   That is doubtful. I think the record

25   evidence tells us that Google established the

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1   categories based largely on how Apple chose

2   its categories.

3   Now, it's possible that just as a

4   -- a pool player doesn't have physics in the

5   back of their mind, that they're -- they're

6   respecting the laws of physics. I think

7   that's a famous Bill Friedman quote, that when

8   Google is assembling its categories, it's

9   doing it in a way that satisfies the IIA.

10   But it certainly would be

11   astounding if -- if they had, if some

12   marketing person had the IIA at the top of the

13   mind when they were selecting the categories.

14   Q.   Right.

15   Because to your knowledge,

16   Google's decision with -- to establish the

17   categories in the Google Play Store was made

18   as a matter of marketing?

19   MS. GIULIANELLI: Objection to

20   form.

21   THE WITNESS: I think -- I think

22   that as I just stated, the record evidence

23   suggests that Google was -- had an eye towards

24   how Apple had designed its own categories, and

25   I think that ultimately Google wants to

ATTORNEYS' EYES ONLY

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1   maximize the profits of the -- of the Play

2   Store, and so it wants consumers to be able to

3   find things easily and sensibly and it's --

4   it's profit drivenal; how about that?

5   BY MR. RAPHAEL:

6   Q.   And in trying to maximize the

7   profitability of the Play Store, Google

8   established the categories by reference to the

9   categories in the Apple App Store; is that

10 right?

11   A.   In part, yes. That Google -- that

12 Apple made presumably intelligent choices,

13 Apple's App Store was doing well and -- and

14 Google figured that given that they are

15 recruiting some of the same developers who are

16 already on the App Store, that it would make

17 sense to not disorient developers in the

18 same -- in that sense.

19   Q.   Okay.

20   If the IIA assumption is not

21 satisfied, then the Logit model can lead to

22 unrealistic forecasts.

23   Do you agree with that?

24   A.   No, I think -- I think you asked me

25 that earlier, and I think that it depends on

ATTORNEYS' EYES ONLY

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1   the degree to which it's not satisfied, right?

2   In any econometric model, just

3   even ordinary lease squares, we -- we -- we

4   make all sorts of demands on the nature of the

5   error terms in the model, just as we do here.

6   And there are -- there are errors, there are

7   violations and there are other violations.

8   And so I wouldn't -- I wouldn't condemn it

9   based on -- on some small violation.

10   I think -- I think that if the

11   categories were haphazardly assigned or done

12   without any kind of economic logic such that

13   consumers did not perceive, or at least some

14   consumers did not perceive the elements to be

15   substitutes, that -- that you could get

16   unreliable forecasts.

17   Q.   Okay.

18   So if consumers do not believe

19   that the products being studied in the Logit

20   model are substitutes, you can get unreliable

21   forecasts?

22   MS. GIULIANELLI: Objection to the

23   form.

24   THE WITNESS: I think that the

25   better -- the better requirement, or the more

ATTORNEYS' EYES ONLY

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1   formal requirement, is that if -- if this

2   property of substitution that is at the heart

3   of Logit, which is this proportional

4   substitution, that people tend to go places

5   with higher shares, then you could get a less

6   accurate forecast than -- than -- than you

7   would hope.

8   I think that unreliable is -- is

9   fairly strong language, so I'm reluctant to go

10   that far.

11   MR. RAPHAEL: Okay.

12   BY MR. RAPHAEL:

13   Q.   And what is the standard for when IIA

14   has been violated to such a degree that you

15   think that the -- using the Logit model would

16   lead to forecasts that are inaccurate?

17   A.   So here's some things I -- I would

18   want to look for, is did the categories make

19   economic sense, all right? Is there -- is

20   there good economic basis to believe that both

21   the developers and the consumers perceived

22   those cat -- categories to define the contours

23   of competition? And I think we have that

24   here.

25   But the second thing that I'd want

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1   trying to predict are, say, the -- the

2   predicted shares within a category and he

3   thinks that those forecasts could be off,

4   that's not the forecast that I'm making. So

5   it's just the word "forecast" is so general

6   that it's hard for me to -- to say that it has

7   much relevance here.

8   Q.   Do you agree that the Logit model can

9   produce seriously misleading forecasts if IIA

10   fails?

11   A.   Seriously misleading forecasts?

12   Q.   Um-hmm.

13   A.   Well, so here we're trying to predict

14   pass-through rates, and I don't think that our

15   pass-through rate forecast is going to be

16   seriously misleading for some minor infraction

17   of the IIA. And in particular, you know,

18   what's happening is that on a technical

19   matter, we're -- we're concerned about some

20   unobserved attribute being correlated with the

21   error terms. But if the groupings are done in

22   an intelligent fashion, all these error terms

23   are going to cancel. They're going to wash

24   out.

25   And so I feel like -- I feel like

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1   again, so long as the groupings are

2   intelligent, so long as the model fits and

3   you're getting statistically significant

4   coefficients on the price terms, the R-squared

5   is high, I think that's all telling you that

6   -- that you could have good faith in the

7   accuracy and integrity of the prediction.

8   Q.   Are you familiar with an economist

9   named Dan McFadden?

10   A.   Yes.

11   Q.   Who is Dan McFadden?

12   A.   So McFadden is a Nobel Prize winner.

13   He is a pioneer in the area of conjoint,

14   choice base conjoint surveys, and McFadden is,

15   who I mentioned earlier about the

16   Hausman-McFadden test for IIA, which is itself

17   partially controversial; it's not -- not the

18   best test ever, but -- but in any event, it

19   can't be applied here, given the nature of the

20   data that we have.

21   Q.   Okay.

22   Are you familiar with the Red

23   bus/Blue bus problem?

24   A.   I've come across it. I've come

25   across it before, but -- but you might have to

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1   remind me as to exactly how the problem works.

2   Q.   So sitting here today, can you tell

3   me about the Red bus/Blue bus problem in

4   economics?

5   A.   I don't think I can give you great

6   detail on the Red bus/Blue bus, but -- but if

7   we're going into choice probabilities, then

8   McFadden and Hausman would be talking about

9   the likelihood that you'd choose one or the

10   other in the presence or absence of the -- of

11   -- of one of your choices.

12   Q.   Okay.

13   Now, did you run any test in this

14   case to determine whether the IIA assumption

15   was met, and if not, whether it was producing

16   unrealistic forecasts?

17   A.   Yes. And so the way that we got

18   comfortable with the Logit and that the IIA

19   was satisfied was, again, that the groupings

20   were done by Google and self-selected by the

21   firms. The model tended -- did a very good

22   job fitting each category, we got the right

23   sign, it was statistically significant, we got

24   a high R-squared.

25   We tested other demand

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1   intent that was at the front of my mind was

2   will the Logit model do a good job or a bad

3   job at explaining substitution patterns within

4   a given category, right? And implicit in that

5   objective is whether the IIA was satisfied.

6   Q.   Did you cite any published economics

7   article in your reports to establish that it's

8   appropriate to test the IIA assumption using

9   the kind of regression that you did?

10   A.   I don't think I've cited articles in

11   my report that my test was a test of IIA. I

12   think that I feel confident that IIA was

13   satisfied by virtue of the fact that Google

14   selected the categories, the developers

15   selected in, the model fit well and then

16   finally, I tested the model under other demand

17   specifications.

18   There was quite literally nothing

19   else that I could do and there was nothing

20   that your expert did in rebutting it, zero.

21   Q.   Right.

22   A.   Nothing. Dr. Leonard did no test of

23   the IIA.

24   Q.   Right.

25   Other than the regression that you

ATTORNEYS' EYES ONLY

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```
 1   did, there was no way for you to test whether

 2   the IIA assumption was met; is that right?

 3       A.   No, that's not right.  You're not --

 4   you're not hearing what I'm saying.

 5               I have confidence that the IIA was

 6   satisfied because these are economically

 7   sensible categories that were designed by

 8   Google, that were selected into by the

 9   developers.  And then when we go to do the

10   actual fit, had the results come back

11   differently, had the coefficients been the

12   wrong sign, had they not been significantly

13   significant, had the R-squareds been low, and

14   then had another demand model done a better

15   job at explaining the variation of the

16   substitution patterns in the data, I would

17   have abandoned Logit.

18       Q.   Okay.

19               Other than your regression, was

20   there any test you are aware of that you could

21   have applied to determine whether the IIA

22   assumption was met?

23       A.   Yes, and I now feel like I'm

24   repeating myself.  There is the

25   Hausman-McFadden test.
```

ATTORNEYS' EYES ONLY

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1   Q.   But you couldn't apply that here,

2   could you?

3   A.   Let me finish. Let me just finish.

4   Yeah, the Hausman-McFadden test

5   requires you to drop all consumers from the

6   data who selected a particular choice and then

7   re-estimate the model and -- and compare the

8   coefficients, right?

9   Yes, you cannot do that here

10   because we don't have that kind of granularity

11   in the data.

12   Q.   Are you aware of any source in

13   economics that indicates that it is an

14   appropriate and reliable way to test for the

15   IIA assumption to do the kind of regression

16   that you did here?

17   A.   I don't think that that's how you'd

18   find it in a textbook. I think that the way

19   that an econometrician would counsel you is

20   you have an assumption about how consumers

21   choose within a category; right? If the model

22   doesn't fit well, then that would tend to

23   indicate that assumption is violated. But it

24   starts with the -- with the goodness of fit of

25   the model itself.

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1   Q.   Okay.

2   Are you aware of any source in

3   economics that indicates that it's a reliable

4   way to test for the IIA assumption to do the

5   kind of regression that you did?

6   A.   Let me hear it back. I'm sorry.

7   Q.   Are you aware of any source in

8   economics that indicates that doing the

9   regression that you did is an appropriate and

10 reliable way to test for whether the IIA

11 assumption is met?

12   A.   I don't know if -- if I can point

13 you, sitting here, to an economic source for

14 that proposition, but what -- what economics

15 counsels is that to determine whether a model

16 is appropriate, you need good economic

17 foundation and you need a goodness of fit in

18 the data.

19   And then finally, what I did is I

20 tried alternative specifications. I don't

21 think there's anything else that we can do.

22   Q.   Okay.

23   Are you aware of any source in

24 economics that goodness of fit is an

25 appropriate way to test for the IIA

ATTORNEYS' EYES ONLY

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1   assumption?

2   A.   No.   The way that the economics will

3   tell you is that goodness of fit will tell you

4   if the Logit is a -- is a -- is the relevant

5   way to describe preferences in substitution

6   patterns here.

7   Now, IIA is lurking in the

8   background of all of that.

9   Q.   Right.

10   But you're not aware of any source

11   in economics that goodness of fit is an

12   appropriate way to test for the IIA assumption

13   directly?

14   MS. GIULIANELLI: Objection to the

15   form.

16   THE WITNESS: I think that if you

17   go into the economic literature and you see

18   the vast application of Logit in antitrust,

19   mergers in particular, I think that for an

20   economist or an agency, or an agency's

21   economist to feel good about using Logit, what

22   they care most about is whether the categories

23   were constructed intelligently and with a good

24   grounding in economics and in -- in record

25   evidence.

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1   And so that -- that is how I

2   think -- and then finally the goodness of fit

3   of the model itself. I feel like that's the

4   way that an economist would counsel the choice

5   in the demand system.

6   BY MR. RAPHAEL:

7   Q.   And one of the things you pointed to

8   with respect to your Logit model is the

9   negative sign in the regression that you

10   conducted; right?

11   A.   That's -- that's right. That's

12   telling us that within the category, that all

13   things equal, controlling for all the other

14   things that we've controlled for in the -- in

15   the regression, that the higher the price of

16   that app, the lower its predicted market

17   share.

18   Q.   Right.

19   Your regression correlates the

20   independent variable, which is the price, with

21   the dependent variable, which is the share of

22   the category?

23   A.   Controlling for all of the things,

24   including app fixed effects and the like.

25   Q.   Right.

ATTORNEYS' EYES ONLY

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1   certainly looked at it. It's a -- it is -- it

2   is something that is nice to have, and it

3   turned out that it works well here, and so --

4   but it's not dispositive. It's just one of

5   those things that are nice to have.

6   Q.   Right.

7   The R-squared in your regression

8   is not dispositive of whether the Logit model

9   is doing a good job?

10   A.   Well, I think that it's just one

11   piece of evidence among several that are all

12   pointing in the same direction. So I want

13   to -- I want to note it, I want to note that

14   hey, we're explaining over 85 percent, or

15   whatever it is, the variation in shares within

16   a category over and above that which can be

17   predicted by the mean shares alone, with

18   these -- with these independent variables that

19   it's doing -- that's a high R-squared.

20   Q.   But the R-squared is measuring the

21   correlation between the independent variable

22   and the fixed effects with the share; right?

23   A.   The R-squared is -- is a measure of

24   the totality of the model, so it's all the

25   variables combined.

ATTORNEYS' EYES ONLY

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1   Q.   And are you familiar with the

2 over-fit problem with regressions?

3   A.   Yes. You can over-fit a regression

4 if you include too many variables, that's

5 right.

6   Q.   Right.

7   And choosing a set of variables --

8 choosing a set of explanatory variables based

9 on the size of the R-squared can lead to

10 nonsensical results?

11   A.   Right. I would not allow R-squared

12 to, by itself, dictate the choice in model

13 selection.

14   So again, to repeat, the fact that

15 R-squared was high here was a nice thing, it

16 was worth mentioning, but it wasn't

17 dispositive.

18   Q.   And other than the R-squared being

19 high, what were the indicators that led you to

20 decide that the Logit model was a good fit?

21   A.   And I feel like we've been through

22 this, but I'm happy to go back through. We

23 start with, you know, were the categories

24 economically meaningful.

25   Q.   Right.

ATTORNEYS' EYES ONLY

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1   A.   And -- and we -- we know that Google

2   designed the categories.   And then we also

3   know that developers selected into these

4   categories, so that tells you right off the

5   bat that there's significant economic meaning

6   to these categories; they're not just thrown

7   together in a haphazard fashion.

8   And then the next thing I want to

9   look at is whether, within a category, we get

10   the expected sign on the price coefficient and

11   whether it's statistically significant.

12   I also look at R-squared, but then

13   finally, to kick the tires, we want to make

14   sure that there is not an alternative demand

15   system that does a better job in explaining

16   substitution patterns, right?

17   So we tried other demand systems.

18   And we found that attached to each one of

19   those, as Dr. Leonard likes to point out,

20   attached to the linear is the 50 percent

21   pass-through rule.   I'll just tell you, if the

22   linear had fit the data better, then my

23   pass-through would be 50 percent.   I'm just

24   going to go wherever the data takes me.

25   Q.   Did you -- which other demand systems

ATTORNEYS' EYES ONLY

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1   did you consider besides Logit at the time of

2   your opening report?

3   A.   I considered linear and I also

4   considered but did not rely on the constant

5   elasticity demand.

6   Q.   Okay.

7   So you considered a constant

8   elasticity demand model, but you didn't put

9   that in your report or disclose the backup to

10   us?

11   MS. GIULIANELLI: And I'm just

12   going to object pursuant to the expert

13   stipulation --

14   MR. RAPHAEL: Well --

15   MS. GIULIANELLI: -- that the

16   questions --

17   MR. RAPHAEL: -- I'll ask it

18   differently.

19   MS. GIULIANELLI: -- have to be

20   about what he relied on.

21   MR. RAPHAEL: Understood.

22   BY MR. RAPHAEL:

23   Q.   So you are not relying on any test of

24   a constant elasticity model in this case?

25   A.   I'm not relying on it, but I'm

ATTORNEYS' EYES ONLY

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1   telling you that I -- I ran that to ground; it

2   just didn't do well. And so --

3   (Overlapping Speakers.)

4   Q.   But you didn't disclose that in your

5   reports?

6   A.   Well, I --

7   MS. GIULIANELLI: Same objection.

8   Same objection. And I would just caution the

9   witness that to the extent that there is

10   something you did not rely on, it would be

11   privileged and -- and covered by the expert

12   stipulation.

13   THE WITNESS: Well, I certainly

14   did not rely on the constant elasticity. I

15   didn't rely on linear, but the reason why

16   linear came up is because your expert offered

17   it as an alternative and said hey, if Singer

18   had gone with linear, you know, the

19   pass-through would have dropped from 90 to 50

20   and look what happens, damages fall by a lot.

21   Well, yes, because pass-through is an

22   important element of damages.

23   But for him to be right, linear

24   would have to be a -- a -- do a good job or a

25   better job of explaining the data, and linear

ATTORNEYS' EYES ONLY

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1   on developers until fairly recently in the

2   database. So -- and -- and Google announced

3   that the reason why they were withdrawing the

4   restriction was at the behest of developers;

5   that is, developers wanted to get off 99,

6   which suggests that there's nothing special in

7   the developers' mind about 99. They -- they

8   want to be able to have the flexibility to go

9   down or up if -- if the demand dictated that.

10   BY MR. RAPHAEL:

11   Q.   Is it your testimony that Google

12   required prices to end in 99 cents?

13   A.   For -- for -- for at least certain --

14   yes, they -- I believe that you couldn't go

15   below 99. There was a 99 percent -- 99 cent

16   restriction --

17   Q.   Right.

18   A.   -- that a lot of developers were at,

19   and Google only recently took it down. And

20   Google said that the reason why they took it

21   down was -- was to satisfy the demands of

22   developers.

23   I also note that Apple imposed an

24   even, I want to say even more rigid, is that

25   proper, a more rigid structure than -- than

ATTORNEYS' EYES ONLY

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1   Google in that they had 99 tiers going up the

2   board. And to the extent that a developer

3   was -- was pricing on both Apple and Google,

4   that could cause the developer to reveal a

5   price that ended in 99 and was also

6   artificially constrained by -- by the Play

7   Store -- by the App Store.

8   Q.   Is focal point pricing important for

9   understanding how developers set prices?

10   A.   Important is -- is kind of a loaded

11   term, so I'll just say that we see a lot of

12   prices ending at 9, but we also know that some

13   of that is an artifact of the rules of the --

14   of the Play Store, of the App Store, so I'll

15   leave it at that.

16   Q.   What percentage of developers set

17   their prices below 99 -- or at 99 cents or

18   below?

19   A.   Oh, well, I've looked into what

20   happened when Google released them from the

21   strictures of the 99 cent rule, and we see a

22   lot, I think it was 40 percent, I'm going by

23   memory here, but you see a lot of app

24   developers who were at 99, and then you look

25   in that year, after Google released the

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1   restrictions, you see a lot of them coming

2   down below 99.

3   Q.   Is focal point pricing a reason why a

4   developer might not reduce prices if Google

5   reduced service fees?

6   A.   I mean, it could be under -- under

7   very extenuating circumstances that I've

8   spelled out at the very end of my Merits

9   report, but -- but here, I think that the

10   prospect of focal point pricing getting in the

11   way, even for those who care about it, of a --

12   of a price reduction is -- is remote and --

13   and -- and that's largely because of how big

14   the delta is between the actual take rate and

15   the but-for take rate. You have a -- a

16   tremendous savings that's going to be enjoyed

17   by each of these developers in the but-for

18   world. And just profit considerations are

19   going to dictate that they come down.

20   Now, when they come down, they

21   don't have to necessarily end in a number

22   other than 9, and I -- and so what I've done

23   in that section is I go through and I say

24   let's constrain everyone to end at a 9, and I

25   calculate, like, the share of developers that

ATTORNEYS' EYES ONLY

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1   would -- that would somehow not move, and it's

2   something below a half a percent. It's de

3   minimus.

4   Q.   Right. So let's -- let's look at

5   that. That's page 203 of your opening Merits

6   report.

7   A.   Okay.

8   Q.   And this is Table 17.

9   A.   Yes.

10   Q.   So you find there that some non-zero

11 amount of developers would not reduce their

12 prices if they were committed to having their

13 prices end in 9; isn't that right?

14   A.   Correct.

15   Q.   Do you know how many developers

16 that -- that amounts to?

17   A.   Sitting here, I don't, but it's --

18 should be easy to figure out the backup.

19   Q.   Did you run a version of this table

20 in your reports with the assumption that

21 developers would want to set prices ending in

22 99?

23   A.   I did not.

24   Q.   Okay.

25   And do you know the percentage of

ATTORNEYS' EYES ONLY

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1   if we're looking -- if we're looking at price

2   effects, you know, between 2016 and 2020.

3   We're going to be touching a hundred percent

4   of the developers' revenues.

5   I mean, just so many things went

6   wrong with this experiment, many of which are

7   not Dr. Leonard's fault. It's just that --

8   it's just the hand that he was dealt. It just

9   doesn't provide a fruitful environment to

10   explore and exploit these take rate

11   reductions.

12   Q.   You re-ran Dr. Leonard's analysis

13   using prices adjusted for inflation; right?

14   A.   Right. And, you know, when you're

15   looking for price reductions in an

16   inflationary environment and you just see

17   flat-lining, it suggests that that can be

18   interpreted as a price increase.

19   Q.   Right.

20   In an inflationary environment

21   where a price stays the same, you can

22   interpret that as a price decrease?

23   A.   Correct. Another -- put differently,

24   if you're trying to test the impact of a take

25   rate reduction, and all the sudden, prices

ATTORNEYS' EYES ONLY

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1   start shooting through the roof, that could

2   conflate inferences that you would otherwise

3   be able to make in a -- in a more controlled

4   experiment.

5   Q.   Right.

6   So if Google kept its service fees

7   the same during an inflationary period, should

8   we interpret that as a reduction in Google's

9   service fees?

10   A.   Not necessarily, because Google is

11   making more revenue when the app price revenue

12   goes up, right? Google is keeping 30 percent

13   of all revenues generated. And to the extent

14   that inflation was putting upward pressure on

15   app prices, I think that's going to redound to

16   the benefit of Google.

17   Q.   So when developers keep their prices

18   the same during an inflationary period, they

19   are reducing their prices, but when Google

20   keeps its prices the same during an

21   inflationary period, it's not?

22   A.   No, because Google sets a very

23   particular price, right? Google's price is a

24   tax. So Google doesn't need to -- Google

25   doesn't need to raise its tax rate in order to

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1   variation on the right-hand side.

2   Q.   And how about in your Logit model;

3   did you use the percentage rate or did you use

4   the gross amount of the change in marginal

5   cost?

6   A.   Remember, the Logit model, you're

7   doing -- the apps share within the category on

8   its price.

9   Q.   Okay.

10   A.   Yes, so I just don't think that that

11   question gets at what we did in the Logit

12   model.   That's possible.

13   Q.   That's okay.

14   I think we've covered this before,

15   but I just want to make sure the record is

16   clear.

17   A change in an ad valorem fee will

18   affect prices proportional to other marginal

19   costs?

20   MS. GIULIANELLI: Objection to the

21   form.

22   THE WITNESS: We have covered it

23   before in my first deposition, and you pointed

24   me to an equation, the Lerner index, which

25   would suggest that that could be the case if

ATTORNEYS' EYES ONLY

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1   you tried to do the derivative in your head.

2   I think that when you look at the

3   traditional models of pass-through, which,

4   remember, are a derivative of the -- if you

5   think of it as a derivative of the Lerner

6   index, it's -- it's looking at how the profit

7   maximizing price changes in response to a

8   change in cost.

9   And then you look at the most

10   common functional forms. You'll often see

11   that marginal cost drops out of the

12   pass-through equation.

13   BY MR. RAPHAEL:

14   Q.   Well, does it drop out when you're

15   looking at an ad valorem cost?

16   A.   In this case, it drops out of the

17   pass-through equation, yes.

18   Q.   Okay.

19   And can the amount of a

20   developer's marginal cost, other than the

21   service fee, affect the amount of

22   pass-through?

23   A.   Not under the Logit model that I'm

24   using. It's conceivable it could in others,

25   but in my Logit model -- not -- in the Logit

ATTORNEYS' EYES ONLY

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1   The most -- I mean, the most

2   obvious one would be processing fees. But

3   there are other marginal costs, royalty fees

4   that they pay, but -- but I haven't estimated

5   those at the developer level.

6   Q.   One of the inputs into your

7   pass-through model is Google's market share in

8   a world without the challenged conduct.

9   A.   Not in the pass-through model. Did

10   you mean to say -- it certainly -- Google's

11   market share is in Rochet-Triole and it's in

12   Landes-Posner.

13   Q.   Yes. One of your inputs into

14   calculating what Google's but-for service fee

15   would be is Google's market share in the

16   but-for world.

17   A.   Correct.

18   Q.   And you estimated that share to be 60

19   percent; right?

20   A.   I -- I used as an input the

21   60 percent because that's the best that the

22   economic literature in busting up monopolies

23   can -- can give to us.

24   I also, you know, would note --

25   yes, that is -- that is the best estimate that

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1   I could find in the literature.

2   Q.   Okay.

3   And that market share estimate is

4   based on an article that attempted to estimate

5   AT&T's market share in the longest in its

6   telephone market in the 1980s?

7   A.   Yes, with one important caveat that

8   you left out, which was after AT&T's

9   anti-competitive tie was unwound, right?

10   What I -- what I was looking for

11   was the closest analogue in antitrust history

12   in which a dominant firm that had extended its

13   leverage from one market into another was

14   forced to unbundle or break apart the tie.

15   There aren't a lot of such episodes, right, in

16   the history of antitrust for reasons that we

17   could describe -- discuss over coffee, but we,

18   in any event, it's a network industry; it's

19   the monopoly, where the tie gets removed.

20   It's been studied ad nauseam by economists

21   for -- for the price effects that can be

22   attributable. And so I thought that

23   60 percent was the best estimate.

24   And in any event, it turns out

25   my -- my in-app model for damages is not that

ATTORNEYS' EYES ONLY

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1   sensitive to the 60; that is, as you put in

2   different inputs for 60, you go to 70 or if

3   you think that Google share would have fallen

4   to 50, it just turns out that the model is not

5   that sensitive to that input.

6   Q.   Well, do you disagree that if

7   Google's but-for market share is 75 percent,

8   that your damages figure falls by over

9   40 percent?

10   A.   No, it wouldn't. It would not.

11   So you're saying if all you did --

12   see, what -- what Dr. Leonard, respectfully,

13   did was that he kept changing two parameters

14   at a time. He kept changing the but-for share

15   and the actual share. If he held everything

16   constant for Landes-Posner, if you change just

17   the but-for share, say, by 10 percentage

18   points, you get, depending on which direction

19   you go, you get something on the order of a 5

20   percentage point swing in damages.

21   And so what -- what that's telling

22   you is that the input is important, but the

23   results don't vary significantly, or let's

24   just say the results aren't amplified based on

25   the change in this input; that they're, in

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1   fact, they -- they are -- they are reduced,

2   right, because you go with a 10 percentage

3   point change, you get a much, much smaller

4   change in damages.

5   Q.   Did you look at any firms in any

6   competitive markets that benefit from network

7   effects to see what their share was?

8   A.   Oh, sure. Remember I -- I looked at

9   a whole host of -- of industries in which case

10   a leader lost share, including in network

11   industries. I think Netflix may have been one

12   of them.

13   But I -- I looked at -- I looked

14   at as much -- as much literature as I could

15   find on this issue of network industries, you

16   know, where a leader loses share, and I felt

17   that there are a lot of reasons why a leader

18   can lose share, right? It could just be

19   because the market was contestable.

20   But -- but I felt that it was

21   really important to be able to exploit an

22   episode in history in which a dominant firm

23   lost its grip on a tied market because the --

24   because the government told it that it could

25   no longer engage in the tie. I felt that that

Page 154

1   was about as close as you could get to what

2   we're trying to get at here.

3   Q.   What is Microsoft's current share in

4   operating systems for PCs?

5   A.   Well, that wasn't the tied market, of

6   course. I think the more relevant --

7   Q.   Well, wasn't tying at issue in

8   Microsoft?

9   A.   It absolutely --

10   MS. GIULIANELLI: Objection to the

11   form of the question.

12   THE WITNESS: It absolutely was,

13   but that wasn't the tied market, as Karma

14   knows. The tied market there was the browser.

15   And so what I looked at was the browser share

16   and the browser share disappeared.

17   So if you really want me to use

18   the Microsoft example, I'm happy to, but it's

19   going to cause damages to be much, much bigger

20   than the one that -- that I went with.

21   BY MR. RAPHAEL:

22   Q.   Did you use the 60 percent market

23   share as an input into the single take rate

24   model?

25   A.   I believe we needed input, you asked

ATTORNEYS' EYES ONLY

Page 163

1   opting in and participating in a loyalty

2   program, and if the benefits for doing so are

3   paltry, that could affect how many people take

4   advantage of the program.

5   Q.   Right.

6   There are costs to opting into a

7   rewards program; right?

8   A.   Yes.

9   Q.   Okay.

10   And in the -- in your Play Points

11   damages model, you assume that all Play Store

12   users would have signed up for the Play Points

13   program?

14   A.   No.

15   Q.   You don't?

16   A.   No, not necessarily. What I'm trying

17   to solve for is the extent of a subsidy that

18   Google would have offered across -- in the

19   aggregate across all users, but I don't think

20   that I'm necessarily assuming that each user

21   avails itself. It's possible that it would,

22   but my -- my damages model for aggregate

23   damages is looking at the savings to the class

24   if Google were to be more generous in its

25   subsidy program.

Page 164

1   Q.   Your Play Points model measures the

2   damages that consumers would have incurred in

3   the aggregate?

4   MS. GIULIANELLI: Objection to the

5   form.

6   THE WITNESS: I think that my

7   model is being offered for an estimate of

8   aggregate damages, among other things; I think

9   it also speaks to injury and impact. But I --

10 I -- I believe that that -- that -- that

11 parameter that comes out that we're interested

12 in, which is the price on the consumer side of

13 the market, is telling you across all

14 consumers, this is -- this is what -- what --

15 what Google will pay.

16 BY MR. RAPHAEL:

17   Q.   Does your Play Points model tell the

18 jury how much a user who did not sign up for

19 Play Points in the actual world was damaged?

20   A.   You could estimate, for a given

21 member of the class, you could estimate what

22 the reduction in -- in his or her net payments

23 would be relative to what they spent in the

24 actual world. And you wouldn't abandon that

25 exercise simply because they didn't use Play

ATTORNEYS' EYES ONLY

Page 165

1   Points in the real world. In the real world,

2   the reason why most people or many people

3   didn't use it is because Google was so skimpy

4   with the offering.

5   In a but-for world in which Google

6   is forced through competition to employ a more

7   generous points model, including making the

8   enrollment easier, they'd -- they'd be forced

9   to. Under -- in a competitive market, it

10   would be reasonable to assume that -- that

11   most, if not all, consumers in the class

12   would -- would partake and -- and take

13   advantage of that -- of that program.

14   Q.   Are you offering the opinion that all

15   users in the but-for world would have signed

16   up for the Google Play Points program?

17   A.   Economists tend to be reluctant to

18   say all, like do I know with certainty or to a

19   reasonable certainty that every single class

20   member signs up? I don't know if the model

21   can tell us that.

22   What the model is telling us is

23   what's the -- what is the aggregate or average

24   subsidy that Google offers. And I think that

25   it is reasonable to infer that if the subsidy

ATTORNEYS' EYES ONLY

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1   gets sufficiently large such that it is a

2   meaningful reward, that most, if not all,

3   consumers will take advantage of it in the

4   but-for world.

5   Q.   Have you estimated what portion of

6   users would have signed up for the Play Points

7   program in the but-for world?

8   A.   I feel like that question is no

9   different from the -- from the last.

10   I have not given an empirical

11   estimate of the proportion. I think it's very

12   high, it could be close to 100 percent, but

13   there's no requirement that it's a hundred

14   percent for the model to -- to hold.

15   Q.   If I were to come to you with a user

16   chosen at random from the data that you've

17   looked at of people that used the Google Play

18   Store, could your model tell me whether that

19   user would have signed up for the Google Play

20   Points program in the but-for world?

21   A.   I don't think the model tells you

22   whether a user will sign, but what the model

23   can tell you is what the subsidy, what the

24   predicted subsidy would be for that user. And

25   if the subsidy is as large as these models are

ATTORNEYS' EYES ONLY

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1   implying, whether it's the Rochet-Triole model

2   or the Amazon model, these are big numbers;

3   we're talking about ███ to ███ percent savings.

4   It seems like a safe inference is

5   that if a -- if Google wants to credit you

6   between ███ and ███ percent, I'm going by

7   memory, of the -- of the price of partaking in

8   all the fun of its Play Store, that most, if

9   not all, consumers will avail themselves of

10   that option.

11   Q.   Have you calculated the minimum value

12   of the Play Points subsidy that would be

13   necessary to get any consumer to sign up for

14   Play Points?

15   A.   I haven't calculated it down to the

16   decimal, but my opinion is this; that in the

17   actual world, with a -- with a paltry subsidy

18   of ██████████ percent, you see many people not

19   availing themselves of the option.

20   In a but-for world where the

21   subsidy is in the order of ███ to ███ percent,

22   if we -- if Google matches Amazon, I think a

23   safe inference is that all or almost all

24   consumers will avail themselves of that

25   option.

ATTORNEYS' EYES ONLY

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```
 1        Q.    Well, your Play Points model, though,
 2   is about the percentage of the price that
 3   would be credited back to consumers, not the
 4   percentage of Google's revenue; right?
 5        A.    Oh, no, no, no.  Hold on.  We're on
 6   the same page, I think.  It's the percentage
 7   of the price from the consumer's perspective;
 8   right?
 9        Q.    Right.
10        A.    And so if -- if in a but-for world,
11   Google takes its subsidy from, say, ███
12   percent to ██ percent, right, that is a
13   material change in the terms of the program,
14   at which point you're looking at all your
15   friends who are getting ██ percent off and you
16   say hey, sign me up, I'll take some of that,
17   too.
18        Q.    Right.
19              Have you calculated the percentage
20   credit on the price that would be necessary
21   for any consumer to find it worth it to
22   overcome the cost of signing up and sign up
23   for the Play Points program?
24        A.    I haven't calculated the percentage,
25   but I will say that in a but-for world where
```

ATTORNEYS' EYES ONLY

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1   Google is going head-to-head with a -- with a

2   competitor who is competing on this dimension,

3   whether it's Amazon or Facebook or Samsung,

4   that Google would make sure that whatever

5   enrollment costs there were, they would not be

6   so prohibitive as to allow that rival to eat

7   their lunch.

8   Q.   Have you done any analysis of the

9   elasticity of demand for the Play Points

10   program?

11   A.   I have done elasticity of demand of

12   consumers with respect to pricing in the App

13   Store. So to the extent that Play Points or

14   any subsidy changes pricing, you could figure

15   out what the sensitivity would be.

16   Q.   But you haven't tested whether what

17   happens when Google changes its Play Points

18   subsidy and how that affects whether people

19   sign up for the Play Store -- for the Play

20   Points program; you haven't done that?

21   A.   Well, it's a bit of a trick question

22   here, because Google has been at -- at this

23   paltry ███ percent, you know, since the advent

24   at least in the U.S.

25   Now, there are some experiments

Page 170

1   that you might be able to look at. In Korea

2   and Japan, I think that Google tried to meet

3   the limited competition that -- that occurred

4   there with an increase in the subsidy. But I

5   haven't studied -- I haven't studied what the

6   reaction would be.

7   I think it's safe to infer that

8   Google felt, and this is just kind of basic

9   economics, that Google felt compelled to meet

10   the competition because they feared that if

11   they didn't -- if they weren't competitive on

12   that dimension, they would lose customers.

13   Q.   Your Play Points model also uses the

14   elasticity of demand from an article about

15   AT&T long distance in the 1980s?

16   A.   That's of the rival elasticity,

17   that's right.

18   Q.   Right.

19   And that's drawn from the same

20   article as the article where you got the

21   but-for share for Google; right?

22   A.   Correct.

23   Q.   And you didn't calculate the

24   elasticity of demand in the but-for world

25   yourself?

ATTORNEYS' EYES ONLY

Page 171

1   A.   Well, this is -- remember what we're

2   talking about is the rival supply elasticity.

3   So Google by the tie doesn't allow any rival

4   to enter and expand, and now you're asking me

5   where's your -- where's your model, Singer,

6   for how PayPal or Stripe, you know, would have

7   responded to an increase in Google's price.

8   They couldn't come in by virtue of the tie.

9   So I don't think that -- that

10   life, by virtue of Google's restrictions and

11   the challenged conduct here, is going to allow

12   us to test for rival supply elasticity

13   particularly in the but-for world.

14   Q.   You didn't present your Amazon Coin

15   damages model at the class certification

16   stage?

17   A.   That's correct.

18   Q.   Why not?

19   A.   I don't think that I had data at

20   that -- at that time to estimate Amazon's

21   subsidy.

22   Q.   And your Amazon Coins damages model

23   is used for calculating aggregate damages?

24   MS. GIULIANELLI: Objection to the

25   form.

Page 172

1   THE WITNESS: Correct. That --

2   that's fair, among other things. But I think

3   that the primary purpose here, now that we're

4   at the merits, is what the -- what aggregate

5   damages are.

6   BY MR. RAPHAEL:

7   Q.   And if I -- again, if I took a user

8   at random from the -- from the data on the

9   users of the Google Play Store, could your

10   Amazon Coins model tell me whether -- how much

11   in subsidy that consumer would have received?

12   A.   Yes.

13   Q.   And could it tell -- and -- and is

14   your idea that the subsidies in your Amazon

15   Coins model would have been part of a program

16   that all users would have signed up for?

17   A.   I think that once you get into the

18   ███ percent range, I think that it would be

19   irrational and illogical for a consumer to

20   pass up that savings. They would figure out a

21   way to get enrolled.

22   Q.   Okay.

23   But you -- again, you haven't

24   studied, with respect to your Amazon Coins

25   model, the percentage of savings that would be

ATTORNEYS' EYES ONLY

Page 180

1   models and I think they're both reasonable.

2   Q.   So you can't say whether it's more

3   reliable for the -- to estimate damages at the

4   ████████████████████████   that you have for the

5   Amazon Coins model or the   ██████████████████

6   that you have for the Play Points model?

7   A.   No. And you keep -- you keep going

8   back to the difference in the magnitude.

9   That's just because we have such a large base

10   of spending.

11   What we're really trying to figure

12   out is as we toggle between the ██ percent of

13   the Play Points and ██ percent, which is about

14   ██ percentage points, should we -- should we

15   credit Google with an incumbency advantage or

16   should we not.

17   I think there are legitimate

18   arguments that would suggest that if entry by

19   a rival were to occur early enough in the

20   place for experience, then it would be -- it

21   would be too charitable to Google to credit it

22   with an incumbency advantage, right? If

23   Google were facing a rival right out of the

24   gate, right, what's the source of its -- of

25   its incumbency advantage?

ATTORNEYS' EYES ONLY

Page 181

1   Q.   Have you formed an opinion as to

2   which of the numerous different damages models

3   that you have is the most reliable one for the

4   jury in this case?

5   A.   I think it's -- it's hard to compare

6   models that are meant to do different things,

7   right? We've got some models that are meant

8   to -- to come up with but-for take rates and

9   pass-through in the -- in the primary market.

10   We've got a different model that's meant to

11   predict the but-for take rate in the

12   aftermarket.

13   I don't know how one would say

14   that one is better than the other. I feel

15   like these are the best that economics has to

16   offer for each of the -- each of the problems

17   that I've been given.

18   Q.   Did you consider using any other App

19   Store as a benchmark for your subsidy model

20   rather than the Amazon App Store?

21   A.   It's -- it's certainly possible I

22   considered. One -- one problem that I had,

23   for example, with the ONE Store is that the

24   ONE Store is competing along both dimensions.

25   I think they took their take rate down and

ATTORNEYS' EYES ONLY

Page 182

1   they did a more generous subsidy program. And

2   remember, in this -- when we go down this

3   branch of the tree, we're thinking about

4   competition that only occurs on one dimension;

5   namely, take rate.

6   And the second thing that -- that

7   worried me about ONE Store is that it's --

8   it's specific to Korea and Amazon was -- was

9   global. And so I felt that -- that we just

10 didn't have as good of a benchmark as Amazon

11 for -- for that parameter.

12   Q.   Okay.

13   A.   Oh, there's one more reason, too, is

14 that I don't think we have the magnitude of

15 ONE Store's subsidy. We have the dollar

16 amount, I found press articles that said it's

17 X hundreds of millions of dollars, but I --

18 I -- I wasn't able to -- to generate a -- a

19 subsidy in terms of percent of spend for ONE

20 Store.

21   Q.   Okay.

22   MS. GIULIANELLI: Pretty soon we

23 can take a break for lunch.

24   MR. RAPHAEL: Sure.

25 BY MR. RAPHAEL:

ATTORNEYS' EYES ONLY

Page 183

1   Q.   Did you -- did you analyze whether

2   any of the benchmark App Stores in Table 7

3   offer subsidies and whether you could use

4   those as benchmarks?

5   A.   I did not.

6   Q.   Okay.

7   Just a couple more questions and

8   we can take a break for lunch.

9   A.   Okay.

10   Q.   Now, users sign up for Play Points

11 and then they earn points when they make

12 purchases; right?

13   A.   Correct.

14   Q.   And Amazon Coins have to be purchased

15 separately?

16   A.   Correct.

17   Q.   Did you consider whether that

18 difference could affect whether the Amazon

19 Coins program is a proper benchmark?

20   A.   I certainly considered it, and I just

21 want to make clear that in my -- in my but-for

22 world under this model, I am not positing that

23 Google mimics Amazon's program verbatim,

24 right. I recognize there are differences in

25 the program.

ATTORNEYS' EYES ONLY

Page 187

1   A.   Close.   It's just -- yeah, the share

2   of that developer within its category, that's

3   right, its market share.

4   Q.   Right.

5   And so what the regression is

6   looking at is if the developer changes its

7   price, does that reduce its share of the app

8   category; right?

9   A.   Right.   Implying that -- that there

10   would be substitution away from that app

11   towards what consumers perceive to be

12   substitutes.

13   Q.   Right.

14   And does the regression that you

15   ran that looks at the change in price and its

16   effect on the developer's share of its

17   category tell you anything about where the

18   substitution, as you put it, comes from?

19   A.   Where it comes from is, of course,

20   the app who is raising the price.   Did you

21   mean to say where it's going?   I don't --

22   where it's coming from --

23   Q.   Ah, thank you for that.

24   A.   Okay.

25   Q.   I'll ask a better question.

ATTORNEYS' EYES ONLY

Page 188

1   A.   Okay.

2   Q.   So your regression that you ran in

3   connection with your Logit model, does it tell

4   you where, when a developer raises its price,

5   where consumers will substitute to within the

6   category?

7   A.   This -- this particular model, or at

8   least for this purpose of a model, or this

9   stage of the model, it is simply telling you

10 that the developer loses share. But once you

11 know that the model fits and is the best

12 demand system for the data, you can infer that

13 users are moving around the category in

14 proportion to the market share of the -- of

15 the other goods.

16   Q.   Okay.

17   But the regression is one of the

18 things you used to determine the fit of the

19 model; right?

20   A.   Correct.

21   Q.   Okay.

22   And the regression, itself, does

23 not tell you when a developer raises its price

24 or lowers its price, I guess, to which apps do

25 the other -- do the consumers substitute;

Page 189

1   right? It doesn't tell you that?

2   A.   Correct.

3   Q.   Do you agree that the relevant

4   product market should include all competitive

5   constraints?

6   A.   No.

7   Q.   Is product quality --

8   A.   Can I -- also, can I just say why? I

9   mean I --

10   Q.   Sure.

11   A.   Just to be clear, you don't need to

12   include all competitive constraints because

13   there could be some very weak constraints that

14   don't prevent the exercise of market power.

15   So if the guidelines are telling

16   you to include only those that are necessary

17   in order to effectuate a price increase over

18   competitive levels, so that was the only part

19   I was pushing back on.

20   It's not all competitive

21   constraints, right? It's not every one under

22   the sun. And maybe we could define what you

23   mean by competitive. But -- but I took it to

24   mean literally any competitive including weak,

25   right? We don't need weak constraints to be

ATTORNEYS' EYES ONLY

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1   across consumers. But I never make a forecast

2   in a but-for world of what a consumer would

3   choose, for example, if one of the options

4   were taken away, or if one of the prices were

5   higher. That's not the purpose.

6   So I think you might be

7   misunderstanding the purpose of my model.

8   My -- the purpose is to confirm

9   that the Logit does the best job explaining

10   the substitution patterns of the data. And

11   once we know that, once it fits, once we try

12   Linear, once we try constant elasticity, once

13   we determine that Logit is the best, then we

14   say, okay, what does the literature tell us

15   about the implied pass-through rate if Logit

16   is the demand specification.

17   Q.   I want to make sure we're super clear

18   and we'll -- we'll wrap up with this line, I

19   assure you.

20   A.   Okay.

21   Q.   I want to make sure we're really

22   clear about this, so I'm going to take you

23   step by step.

24   Okay. You've used a Logit model

25   to model demand in this case; correct?

ATTORNEYS' EYES ONLY

Page 418

1   A.   I have used a Logit model to assess

2   at demand choices across apps within a given

3   category, that's correct.

4   Q.   Right.

5   And by doing that, what you are

6   trying to model are the substitution decisions

7   that consumers will make between apps in the

8   same category?

9   A.   I'm really trying to figure out if

10 the parameter on price behaves as one predicts

11 under the Logit model; that is, all things

12 equal, if an app's price goes up, does it lose

13 market share to the rivals within its

14 category.

15   That's -- that's what I'm doing

16 with the Logit model.

17   Q.   Okay.

18   And is it your testimony that what

19 Professor McFadden is discussing in this Nobel

20 Prize lecture where he says that it -- the

21 model can produce seriously misleading

22 forecasts if IIA fails, has nothing to do with

23 using the Logit model to assess if demand

24 choices, within a given set of products, are

25 modeled correctly?

ATTORNEYS' EYES ONLY

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```
 1              MS. GIULIANELLI:  Objection to the

 2    form.

 3              THE WITNESS:  Yeah, I do think

 4    we're speaking past each other.  I think the

 5    forecast that McFadden has in mind here are

 6    forecasts that are made from the parameters of

 7    the Logit model after it's estimated, right.

 8    I'm not making any such forecast.  That's not

 9    what I'm using it for.

10              I'm trying to determine if, among

11    a set of standard assumptions on demand

12    shapes, does the Logit assumption best fit the

13    data.  And if I can convince myself that it

14    does, and certainly none of your experts have

15    put anything in to suggest that there's a

16    better fit, then I feel confident in using the

17    pass-through rate under the Logit model.

18              But I'm not making any forecasts

19    based on the parameters that come out of the

20    Logit specification.

21    BY MR. RAPHAEL:

22        Q.   And you think that's what McFadden is

23    discussing?

24        A.   Yes.

25        Q.   And your Logit model though is trying
```

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1   to -- is trying to model the choices that

2   consumers make, isn't it?

3   MS. GIULIANELLI: Objection to the

4   form.

5   THE WITNESS: It's -- it's testing

6   a key assumption built into the Logit, which

7   is does a firm lose share when it raises

8   prices, all things equal, and I can -- I can

9   satisfy that test.

10   BY MR. RAPHAEL:

11   Q.   I just want your clearest statement

12   of what forecast you think Professor McFadden

13   is describing in this article?

14   MS. GIULIANELLI: And I'm just

15   going to object to the extent that he's --

16   he's looking at, you know, one line right now.

17   THE WITNESS: Right.

18   MS. GIULIANELLI: But...

19   THE WITNESS: So -- so for me

20   to -- for me to give you a fully informed

21   decision, I probably would want to read other

22   paragraphs, surrounding text; I don't think we

23   have time for that.

24   But I think that I know this with

25   certainty, that he's not speaking of the

Exhibit F3
Public Redacted Version

FILED UNDER SEAL

Exhibit 13

Program Review: Apps Spend

larissa, marchak, rickysingla

October, 2015

Google Confidential and Proprietary

Notes on Methodology

Excludes China and Apple first party apps
- Consumer spend on iOS is about ~$3.5B annually in China (92% is games)
- Apple first party apps deliver an additional ~$2.6B (biggest apps are Pages, Numbers, and Keynote, biggest markets are US,CN)

Apps considered
- Education category is excluded in this analysis
- Apps that are on Android-only are excluded from the developer and category-level analysis
- Only included devs who have >$1000/month spend on either Play or iOS
- Numbers have been annualized based on monthly average of last 3 months
- No manual verification of content gaps, data is a combination of Playfull and App Annie so some inaccuracies may persist

Gap definitions
- Content gap = apps are not on Play
- Policy gap = apps are on Play but not monetizing
- Performance gap = apps are on Play and monetizing

Market view
- User market has been used for this analysis

Google play

Google Confidential and Proprietary

Executive Summary

Apps spend is underperforming by $5.8B when compared to iOS, performance gap is largest driver
- **Market share**
    - Play Apps spend = 15% total apps spend
    - Play Games spend = 43% total games spend
- **Business Diversity**
    - Play Spend is 10%/90% Apps/Games
    - iOS Spend is 33%/66% Apps/Games
- **Total Play Spend Gap for Apps $5.8B vs. $3.6B for Games**
    - $2.3B Content* Gap - driven by Torso & Tail apps in Tools
    - $1.1B Policy Gap - driven by Head apps in music, entertainment, and social
    - $2.7B Performance Gap - driven by Head across all categories
    - Note: There are also a few apps that outperform on Play (~$300M from apps like Line ($150M), Kakao, etc.)
- **Market Impact: Global Apps Spend on iOS dominated by NA & EMEA, maps to largest Play gaps**
- **Tablet Impact: iPad Accounts for 25% of the gap**

Proposals to address the Gaps:
- Grow Scaled BD to close persistent Apps content gaps
- Enforce policies and require use of Play Billing for Apps IAP and Subscription services
- Direct & Scaled BD drive growth opportunities using data-driven tools to identify highest potential opportunities (Jarvis)

*Content gaps reflect apps that are not on Play - these may become Policy gaps if they were to build for the platform

Google play

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Surplus apps outperform iOS by 300M annually.. LINE contributes 150M out of that (50%)... next one is Kakao at 9M
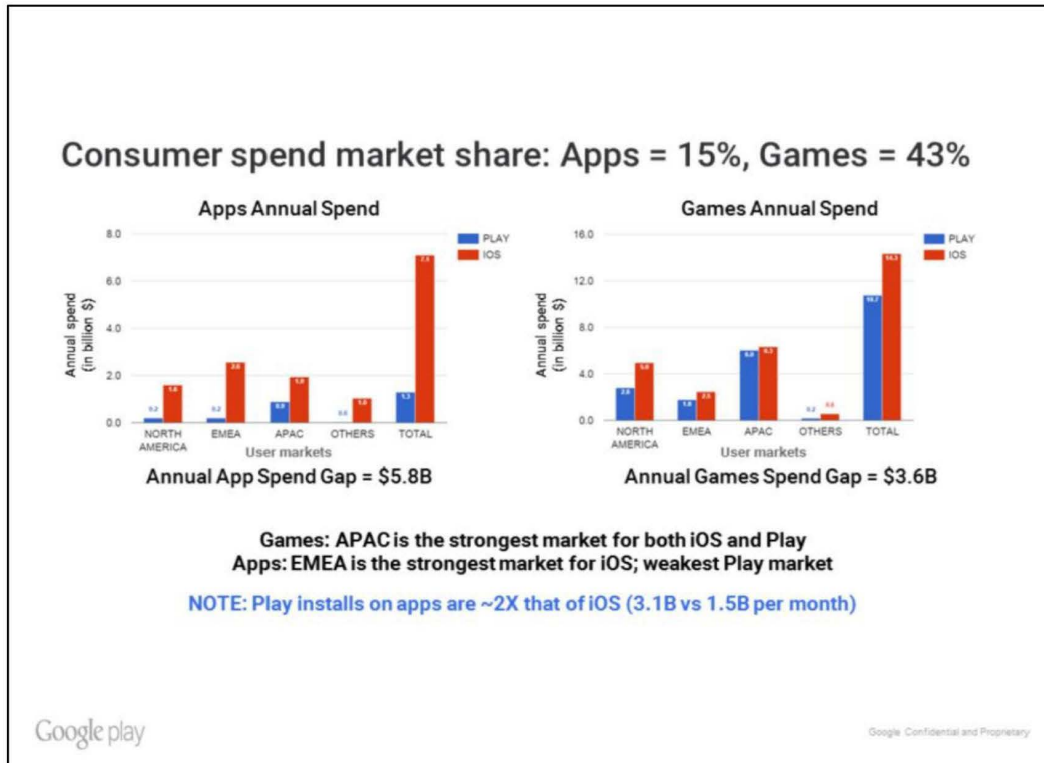
LINE is 72% of APAC play apps spend. excluding LINE, play's markets share in APAC drops from 32% to 17%

Others = 75% LATAM
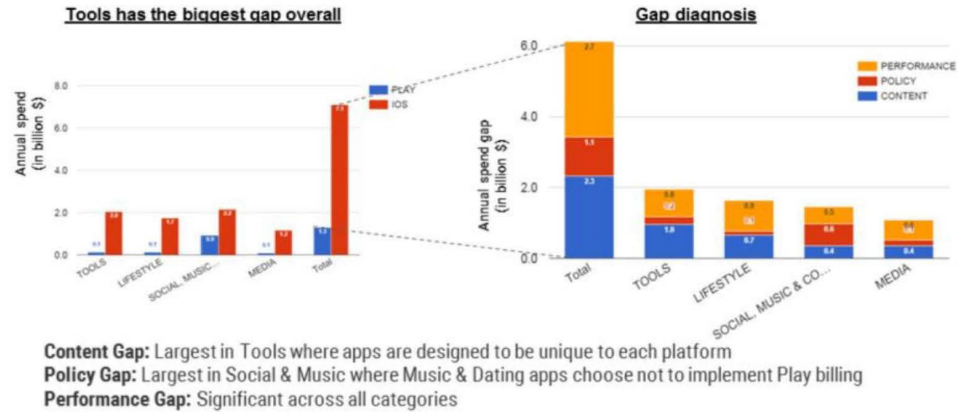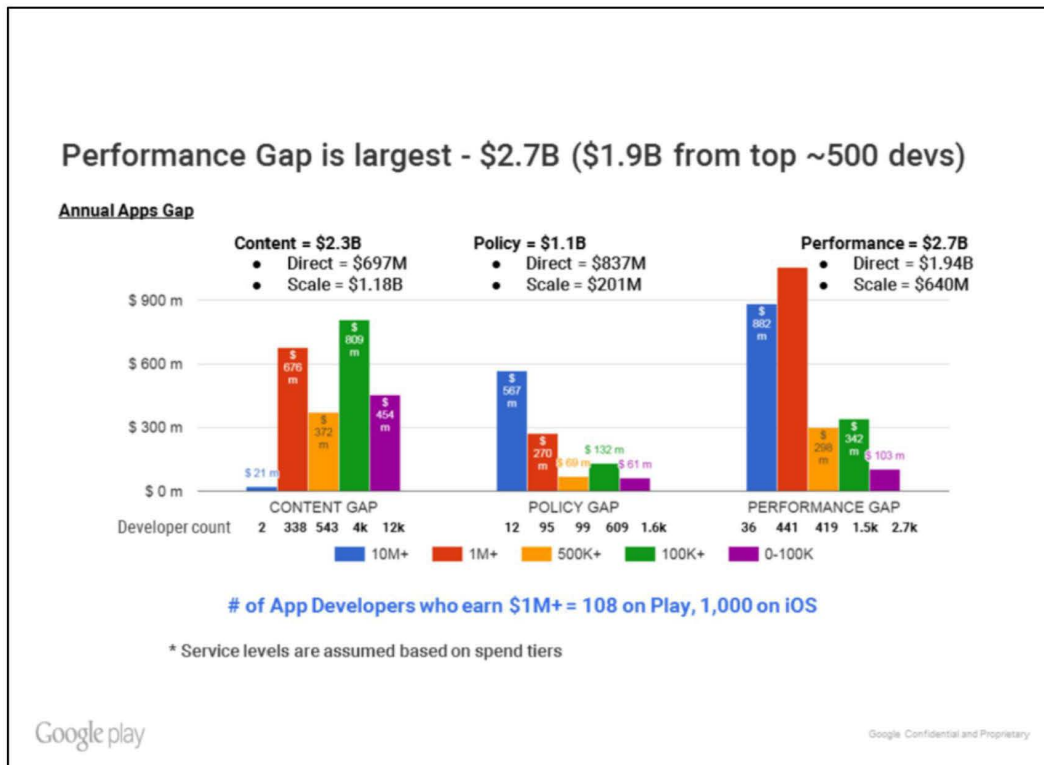
Content = 340 missing developers deliver ~$700M, 16.5k missing developers deliver ~$1.2B → Torso & Tail

Policy = 107 developers deliver ~$800M, 2.3k developers deliver 201M → Head

Performance = 36 developers deliver ~$900M, the next 450 deliver 1.1B → Head

108 apps devs make 1M+ on play

1000 devs make 1M+ on iOS

Content Gap: $2.3B, highly fragmented across 17k devs

Summary:
- Spend gap is concentrated in EMEA at $1B, sizeable gaps in all regions
- Highly fragmented
  - 340 developers deliver ~$700M,
  - 16.5k developers deliver + ~$1.2B

Top apps contributing to gap:
- Concentrated in Tools and Lifestyle
- Top 10 concentrated in US, further manual analysis required to confirm market opp.
- Most developer resistance is around value of Android users, 89% of Gap are paid apps

EMEA consumer spend is 45% of Gap

Tools purchases are 42% of Gap

Top 10 gaps	Dev country	Annual Gap
ForeFlight	US	$ 10 m
Readdle	Ukraine	$ 10 m
XROAD, INC.	Korea	$ 8 m
Touch Press	UK	$ 7 m
Social Star	Hong Kong	$ 7 m
Garafa	US	$ 7 m
OmniGroup	US	$ 7 m
Thumbtack	US	$ 7 m
GenesisCreation.inc	Japan	$ 6 m
Alfadevs	Belize	$ 6 m

Google play

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Of the top 10 missing spend apps, xx are based in yy market
However, there are 300+ more developers making over $1M on iOS - need to manually map their markets

ForeFlight -- Pilot flight planning and services, subscription apps
Readdle - office suite, coming to Android, paid apps
XROAD, INC. - navigation, paid app
Touch Press - history & education, paid app
Social Star - social network boosting, IAP packs for likes, followers
Garafa - GPS, paid app
OmniGroup - office suite, paid app
Thumbtack - services marketplace, IAP credit purchasing from service providers
GenesisCreation.inc - chat app, IAP
Alfadevs - recently banned? music streamer and downloader, paid app

Id	Date	Text
1	10/28/2015 17:20:22	_Marked as resolved_
2	10/28/2015 17:20:31	_Re-opened_
3	10/28/2015 17:23:31	Sure: There are lots of tool devs (e.g. ClockworkMod, CyanogenMod) that build for custom ROMS, which are, inherently, an Android-only tool. Also cleaners, boosters & AntiVirus (e.g. from Liquidum, AVG Mobile) are Android-only
1	10/28/2015 19:18:31	How about launcher and widget-type Tools devs? Sent from Android device.
2	10/28/2015 19:25:38	We are looking for areas that are not applicable to android only
1	10/28/2015 20:40:51	+joecastorena@google.com +joeltnewman@google.com - do you have any examples of developers who build tools for only android platform and not for iOS..
4	10/28/2015 20:40:51	I think you and BV might actually be able to pull this more easily systematically that I. The main tool devs that I work with are building tools that leverage Android-only functionality or build on both platforms.

Google play

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Policy Gap - $1.1B with over 50% in Social & music

Summary:
- Spend gap concentrated in US & EMEA at $800M, and Social & Music at $620M
- Business needs drive decisions
  - Existing billing infrastructure lowers value of Play solution
  - Missing features prevent adoption

Top apps contributing to gap:
- Over 50% of gap is contained in Social & Music - 10 of 12 developers making $10M+ on iOS and Spotify is 18% of total gap
- Another 95 developers make over $1M on iOS

NA has 39% share

$ 500 m	
$ 375 m	$ 424 m
	$ 375 m
$ 250 m	
$ 125 m	$ 173 m / $ 128 m
$ 0 m	

North America   EMEA   APAC   Others

User markets

Social/Music/Comm has 56% share

$ 800 m	
$ 600 m	$ 620 m
$ 400 m	
$ 200 m	$ 216 m / $ 115 m / $ 149 m
$ 0 m	

TOOLS   LIFESTYLE   SOCIAL, MUSI...   MEDIA

Top 10 gaps	Dev Country	Annual Gap
Spotify	Sweden	$ 203 m
LogMeIn	US	$ 64 m
Zoosk	US	$ 43 m
██████	███	████
Skype	US	$ 39 m
Yamaha	Japan	$ 38 m
Hulu	US	$ 31 m
██████	███	████
Linkedin	US	$ 25 m
Beats Music	US	$ 19 m
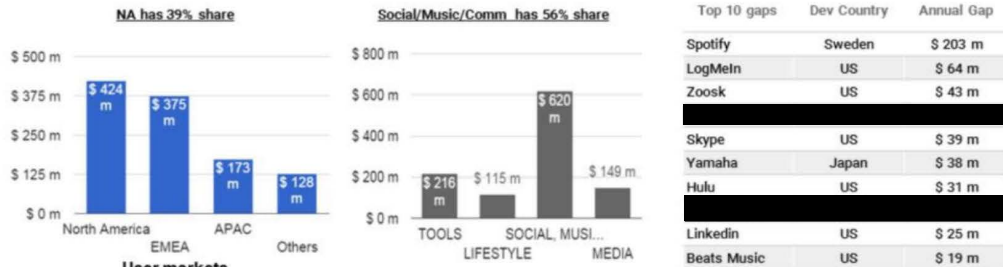
*Policy gaps reflect apps that are not using Play billing but do use iOS billing - there are business drivers of this decision like existing infrastructure, lack of key features, focus on ads for Android users, etc.

Google play

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Performance Gap - $2.7B, $1.9B from top ~500 devs

Summary:
- Spend gap concentrated in EMEA at $1B, and US at $722M
- Lifestyle represents 36% of developers making $10M+ and 31% making $1M+
- Contributing factors are lack of sim ship, platform performance constraints (music)

Top apps contributing to gap:
- Very good relationships and strong investment from top apps
- Consistent underperformance with respect to conversion rates, retention, etc.

Top 10 gaps	Dev Country	Play Spend	Annual Gap
HBO	US	$ 7 m	$ 117 m
██	█	██	██
Pandora	US	$ 33 m	$ 60 m
Sygic	Slovakia	$ 1 m	$ 55 m
Keisokugiken	Japan	$ 0.5 m	$ 49 m
Garmin	US	$ 4 m	$ 48 m
TomTom	NL	$ 5 m	$ 31 m
MagazineCloner	UK	$ 1 m	$ 27 m
Badoo	UK	$ 4 m	$ 25 m
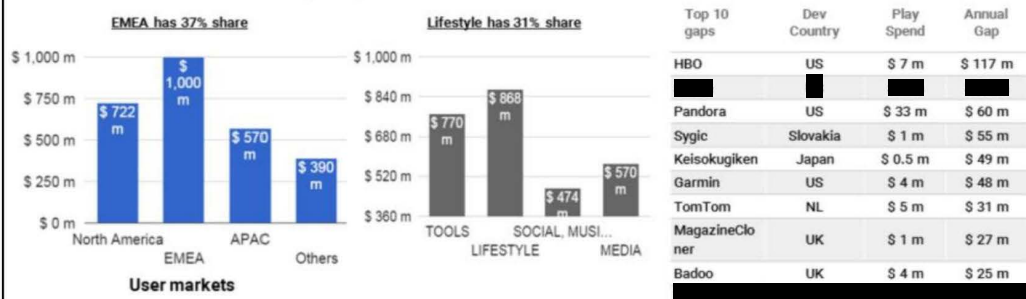
Google play   Google Confidential and Proprietary

Launch delay
Platform performance constraints
Missing product features

Add developer market contribution

Different BD approaches required for each Gap

Content = $2.3B
- Direct = $697M
- Scale = $1.18B

Policy = $1.1B
- Direct = $837M
- Scale = $201M

Performance = $2.7B
- Direct = $1.94B
- Scale = $640M

Challenge: Content Gap is highly fragmented across markets and categories, largely with Torso and Tail developers. It's unclear that Android versions would deliver comparable spend benefit.	**Challenge**: Policy Gap is highly concentrated in markets (NA, EMEA) and categories (Social, Music). There are real short term spend implications but more concerning is the long term impact on growing our active buyer base.	**Challenge**: Performance Gap is highly fragmented across markets, categories, and developer needs. Requires a more robust understanding of business drivers and additional BD resources.
Proposal: Staff Scaled BD to close fragmented Apps content gaps	**Proposal**: Enforce policies and require use of Play Billing for Apps IAP and Subscription services	**Proposal**: Direct & Scaled BD can drive growth opportunities using data-driven tools to identify highest potential opportunities (Jarvis)
Year 1 Spend Estimate: $27M (Close 10% of Gap * 15% Performance handicap)	**Year 1 Spend Estimate: $165M** (15% Performance of Total)	**Year 1 Spend Estimate: $200M** (Increase Play Performance by 50%)

Google play

Id	Date	Text
1	10/26/2015 17:50:13	Yes, they are spend #s, have updated. The slide is saying that using BD levers (and policy) that we believe $400M is addressable in the first year.
2	10/26/2015 17:54:19	The largest difference in how Apple treats apps (compared to how they treat games) is visibility in marketing campaigns. We're refreshing app categories to improve discovery, in some cases these will more closely align with Apples. Overall, the intent was to focus on where the apps business is today with respect to consumer spend (slides 1-10) and tee up some early ideas on BD solutions, not a comprehensive set across all functional activities. We can remove these if they are distracting for today's discussion.
1	10/26/2015 20:53:14	I assume these numbers are spend and not revenue. Is this slide saying that of the $6.1B gap, we believe only $400M is addressable?
1	10/26/2015 20:53:14	Jamie - I think there is a more detailed analysis we could do to see what a reasonable upside estimate is on closing the performance gap. However, it would be based on a lot of assumptions that I'm not sure we could validate until we actually start doing....rather than analyzing.
2	10/26/2015 20:54:22	These proposals don't mention product opportunities. Does the App Store treat app categories differently than we do in Play? Does Apple do anything in its store or other parts of its UI to better promote and encourage the use of apps?
2	10/26/2015 20:54:22	Redbull is an obvious product initiative that could support closing performance gaps.

Google play

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Tablet performance: iPad accounts for 25% of iOS Gap

iPad Spend is **23x** Android Tablet….but only accounts for **25%** of iOS Spend Gap
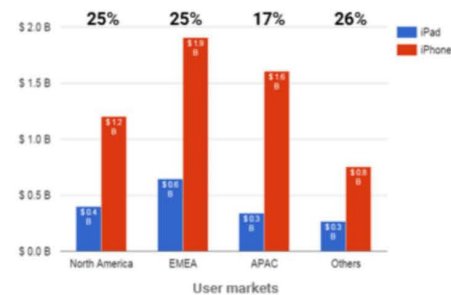
Id	Date	Text
3	10/26/2015 18:36:35	Is there a product opportunity to make Android tablets perform better in this area? If so, what would it be?
3	10/26/2015 18:36:35	The gap is so large it warrants a deeper look overall.

Google play

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Summary

Current state of apps business
- Apps are underperforming by $5.8B when compared to iOS (not including China or Apple apps)
- Project $400M is addressable in the near term through targeted app acquisition, tighter policy enforcement, and proactive consultation
- There are some bright spots
  - Many top performers are using Play billing, we can contribute to optimizing performance
  - Apps are delivering as many buyers as games (with lower LTVs), more work to determine which markets and which categories are delivering active buyers and how to grow contribution

BD Levers
- Staff Scaled BD to close Apps content gaps
- Enforce policies and require use of Play Billing for Apps IAP and Subscription services
- Direct & Scaled BD can drive greater growth using data-driven tools to identify highest potential opportunities (Jarvis)

Google play

Appendix

Google play
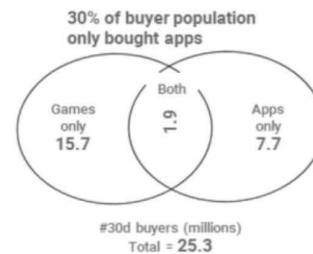
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Exhibit F4
Public Redacted Version

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Exhibit 14

Page 1

```
1    UNITED STATES DISTRICT COURT
     NORTHERN DISTRICT OF CALIFORNIA
2    SAN FRANCISCO DIVISION
3    -----------------------------------X
     IN RE GOOGLE PLAY STORE
4    ANTITRUST LITIGATION
5    Case No.  3:21-md-02981-JD
6
     THIS DOCUMENT RELATES TO:
7    Epic Games Inc. v. Google LLC, et al.,
     Case No. 3:20-cv-05671-JD
8
     In Re Google Play Consumer
9    Antitrust Litigation
     Case No. 3:20-cv-05671-JD
10
     In Re Google Play Developer
11   Antitrust Litigation,
     Case No: 3:20-cv-05792-JD
12
     State of Utah, et al., v.
13   Google LLC, et al.,
     Case No: 3:21-cv-05227-JD
14   -----------------------------------X
15
16            VIDEOTAPE DEPOSITION
17              HAL SINGER, PH.D.
18           Thursday, May 12, 2022
19               9:07 a.m. (EST)
20
21
22
23
24   Reported by:
25   Ryan K. Black, RPR, CLR, Notary Public
```

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1   being reflected in the prices of apps in the

2   transaction data.

3   Q.   Right. And your opinion is that

4   Google's service fees, to the extent that they

5   are supercompetitive, is equivalent to an

6   increase in the developer's marginal cost.

7   A.   It can be understood that way, yes.

8   Q.   Right. And in your report, you've

9   modeled the proper economic way to calculate how

10   a profit-maximizing developer would set prices

11   based on marginal costs.

12   A.   I have. And --

13   Q.   Right.

14   A.   -- and, as you know, it depends on

15   the -- the nature of the demand and the demand

16   specification that you assume, right? Each

17   demand specification you assume is going to apply

18   at different pass-through rates.

19   Q.   Right. So could you go to Page 104 of

20   your report, your opening report, please?

21   A.   Sure.

22   Q.   And you'll see this is a continuation of

23   the Paragraph 225 from the previous page.

24   And you've got a formula there that has

25   "P minus C star divided by P equals one divided

Page 106

1   by E sub D."

2   Do you see that?

3   A.   Yes.   That's the classic Lerner markup.

4   Q.   Right.   So that's -- that's the proper

5   economic model for how a profit maximizing

6   developer would set prices based on marginal

7   costs, right?

8   A.   That model describes the markup over

9   marginal cost as the function of the elasticity

10   of demand faced by the developer.

11   Q.   Right.   And -- and this model on Page

12   104 of your opening report, that -- that's --

13   A.   So --

14   Q.   -- the correct economic mod -- economic

15   way to model how the change in marginal costs

16   will affect the price that the developer charges.

17   A.   It's the -- it's the way to think

18   about it at -- at a very, very high level of

19   abstraction.   But, as you know, to actually

20   estimate the pass-through rate here, I have to

21   make an assumption about the demands curve and --

22   and -- and the precise nature of demand that a --

23   the developer faces, right?

24   Once you --

25   Q.   Understood.

1   A.   -- make a -- once you make that

2   decision, you get these pass-through rules,

3   right? And the pass-through rules -- whether you

4   go linear or logit or -- or constant elasticity

5   -- are going to express pass-through as a

6   function of things that do not include the

7   marginal cost.

8   Q.   Understood. But this formula on Page

9   104 of your report is the correct economic way to

10 model the relationship between the developer's

11 price and the marginal cost in general?

12   A.   Well, I just want to put that caveat in

13 there. It's the -- it's the -- definitely the

14 way to think about it and why it's in my

15 preamble, right?

16   But when I go to model the precise

17 amount of pass-through, I have to make an

18 assumption about what kind of demand the

19 developer faces, right? And that -- that puts

20 me to a -- takes me to a pass-through rule that

21 isn't necessarily going to be denominated in

22 terms of costs.

23   Q.   Understood. So -- but -- but this mod

24 -- this economic model you've described in Page

25 104 of your report, that's generally accepted in

Page 108

1   economics.

2   A.   Yes.

3   Q.   Now, if you just look at the cost term

4   there, C star, and the -- the C star in that

5   formula that you have on Page 104 of your report

6   is equal to C divided by one minus T, right?

7   A.   Correct.

8   Q.   And -- and in that -- in that cost term

9   I just described, T is the service fee rate?

10   A.   Correct.

11   Q.   And C is the developer's per-unit

12 marginal cost other than the service fee?

13   A.   Correct. Processing and the like, yes.

14 Any other --

15   Q.   Okay.

16   A.   Any other types of marginal costs.

17   Q.   Okay. And so one input into the

18 generally accepted economic model of how the

19 profit-maximizing developer would set pri --

20 prices is the marginal costs other than the

21 service fee.

22   A.   For short-run profit maximization, the

23 answer is, yes, that this model, at this high

24 level of ab -- of abstraction, is a function of

25 the marginal cost.

1   Q.   Right. And in terms of how the price is

2   a function of mar -- of --of -- of marginal cost,

3   the -- the -- the formula you've got here on Page

4   104, in that formula, the effect of a change in

5   the service fee -- let me -- let me put it

6   differently.

7   The formula you've got on Page 104, the

8   effect on prices will be -- as a result of a

9   change in the service fee will be proportional to

10   the marginal costs other than the service fee.

11   A.   In -- for short-run profit maximization,

12   yes. For -- for long-run profit maximization,

13   this is not -- this is not the -- the way that

14   you'd get to the effect on price.

15   Q.   Okay. Now, -- so let me just ask,

16   looking at this cost term here, C -- C star, if C

17   in that formula, which is the marginal cost other

18   than the service fee, if that's zero, then the

19   service fee rate will not have any effect on the

20   ultimate price charged according to this model,

21   correct?

22   A.   Let me just say this: It -- it's --

23   it's never zero in the real world. But -- but if

24   you want me to ask -- answer the hypothetical,

25   counterfactually, if we had -- if we had a zero

Page 110

1   marginal cost, then by this model, and this model

2   alone, then in the short run, prices would not

3   adjust to the take rate.

4   As I explain in my report, there's all

5   sorts of reasons why we would still, even in that

6   extreme and counterfactual assumption, would

7   expect prices to change with the change in the

8   take rate, including from steering, including

9   from having to cover all costs in the long

10 run, --

11   Q.   Okay.

12   A.   -- including from sticky prices.

13   Q.   Okay. Now, let me just ask again,

14 hypothetically, if that term C, which are the

15 marginal costs other than the service fee rate

16 in your formula on Page 104, if that term is

17 negative, then a reduction in the service fee

18 rate will actually lead to an increase in the

19 price that the developer would charge.

20   A.   I haven't done that one yet, but I

21 think you've got the -- the sign correct. If you

22 multiply, in that example, 1.43 by a negative

23 cost, I think that there -- there would be a

24 negative relationship in the short run for this

25 equation.

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1   they would land on Microsoft's productivity

2   package would be higher than if they were to land

3   on some obscure package within productivity apps.

4   I mean, it's -- it's very intuitive. It's very

5   natural.

6   Q.   Now, your pass-through formula is based

7   on logit demand.

8   A.   Yes.

9   Q.   And one feature of logit demand is that

10 all goods in the market where demand is being

11 measured are substitutes.

12   A.   I think that's a general -- that is

13 generally the case. That's fine.

14   Q.   Okay. Is it your opinion that all apps

15 in each Google Play app category are substitutes?

16   A.   No. And that's why I invoked this

17 concept of cluster markets. Like, you could --

18 you could take Microsoft's Excel and Microsoft's

19 Word and ask me if they're substitutes, and I

20 would say at -- at that level, they're not.

21 But -- but when you think about the fact that

22 Microsoft and Google are actually competing with

23 a package of productivity apps, that -- that it

24 would make sense to think of that as something

25 more akin to a cluster market the way that we saw

Page 159

1   in the Staples and Office Depot case, that paper

2   clips and a ruler aren't necessarily substitutes;

3   but if the people generally tend to buy those

4   things from the same place, they can belong in

5   the same product market.

6   Q.   So -- but -- but it's not your opinion

7   that all apps in each Google Play app category

8   are substitutes.

9   A.   I just gave an example of Excel and Word

10   as being more -- more of complements, right? But

11   -- but when you think about the -- the cat -- the

12   productivity suite that Google is offering, that

13   -- that's clearly a substitute to what -- what

14   Microsoft is offering in its productivity suite.

15   Q.   Right. So some of the apps in each

16   Google Play category could be complements,

17   correct?

18   A.   They could be.

19   Q.   And some could be substitutes.

20   A.   They could be, yes.

21   Q.   Right. And you haven't put forth a

22   model in your report to determine which apps in

23   each category are complements and which are

24   substitutes?

25   A.   No. And it's not necessary to get the

Page 160

1   implied pass-through rate.

2   Q.   Right.

3   Could you go to Paragraph 78 of your

4   reply report -- well, actually, let me ask you:

5   Are you opining that all apps in each category

6   are part of a cluster market?

7   A.   No. You -- you saw in my report. I'm

8   saying that they don't need to necessarily be a

9   market, a relevant market, for antitrust

10 purposes, and I give you a citation for that.

11   I think that if you -- if you really

12 wanted to -- if you forced it into that box,

13 which is unnecessary and unnatural, that you

14 could -- you could get there by -- by

15 understanding the categories functioning

16 more like a cluster market.

17   Q.   Right. But you're not actually offering

18 the opinion that all of the apps in each category

19 are part of a cluster market.

20   A.   No. I -- I'm offering the opinion that

21 -- that everything within the category -- that

22 the category definitions from Google define the

23 -- the contours or the arena of competition among

24 apps in that category.

25   Q.   Okay. And, again, let's go to Paragraph

1   MR. RAPHAEL: He's here to answer my

2   questions.

3   MS. GIULIANELLI: Okay. Please don't

4   raise your voice at me. I would like the witness

5   to have an opportunity to answer the question.

6   MR. RAPHAEL: I'm not going to sit here

7   and have the witness tell me that my questions

8   are not good questions. I want the witness to

9   answer my questions. So I'm going to ask the

10   question again.

11   BY MR. RAPHAEL:

12   Q   Is it your opinion that in the but-for

13   world that you posit in your report that all

14   developers would participate in the play points

15   program?

16   MS. GIULIANELLI: Objection.

17   THE WITNESS: The question confuses me

18   because a subsidy, an enhanced subsidy to

19   consumers, is about whether consumers will redeem

20   the points. Now, if you're asking me if there's

21   an added requirement that Google says that you

22   cannot -- the developer can't accept the subsidy

23   unless you sign a form with Google, right, the

24   developer would be -- would be crazy not to.

25   This is real money. It's just being paid for by

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```
 1    Google.
 2    BY MR. RAPHAEL:
 3        Q.    So the answer to my question is yes, all
 4    developers would participate in the play points
 5    program in the but-for world?
 6            MS. GIULIANELLI:  Objection.
 7            THE WITNESS:  I -- I like the way that I
 8    said it better, which is that if a developer
 9    thought that a substantial percentage of its
10    customers were going to be redeeming points via
11    this new and improved program, and if Google made
12    some kind of requirement that said you have to
13    sign a piece of paper so that you can accept the
14    payments under this program, the developers would
15    do it.
16    BY MR. RAPHAEL:
17        Q.    Do you know if Google has that
18    requirement in the actual world?
19        A.    I don't know if the Google has the
20    requirement in the actual world.
21        Q.    Would that change your opinion as to
22    what would happen in the but-for world?
23        A.    No.  Because the program, for all intent
24    and purposes, is ███████████████  right now.
25    Google doesn't need to be generous with its
```

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1 points program because Google is immunized from

2 competition. Now, I think it would be

3 considering to look at career where Google was

4 forced because of one store to increase its

5 subsidy to around █ percent and all of a sudden

6 that's starting to approach something real. You

7 know █ percent is not real. █ percent

8 actually might make a difference on purchase, and

9 I'll just leave it at that.

10   Q.   What's your standard for the percentage

11 of cash back accounted for by play points that

12 would make a difference to competition?

13   A.   Not about difference to competition.

14 It's what would be sufficiently generous such

15 that consumers would partake in the program.

16   Q.   And what amount of a cash back would be

17 sufficiently generous that consumers would

18 partake in the play points program?

19   A.   Well, when you think about, like, AMEX

20 customers partaking in their points that American

21 Express gives back, I think AMEX is more generous

22 than █ percent. In fact, Williams has the --

23 the percentage that AMEX shares with its -- with

24 its customers. It's over 1 percent.

25   So, you know, I don't know exactly the

Page 297

1   A.   I think the model is. I think that at █

2   percent, the economic intuition -- well, this is

3   the intuition that I'm drawing from the model --

4   is that when the benefit gets so large, that is

5   going to spur participation and usage in the

6   system.

7   Q.   Great.

8   Your -- your testimony here today, sir,

9   is that you have a model in your reports that can

10 tell the Court and the jury in this case which of

11 the members of the putative class would have

12 signed up for play points and who would have used

13 them?

14   MS. GIULIANELLI: Objection to the form.

15   THE WITNESS: I didn't say that. I said

16 that if the but-for subsidy were to rise to █

17 percent, then it would be embraced -- the play

18 points system would be embraced across the class

19 just as the way that the points system in the

20 AMEX marketplace is embraced across American

21 Express users.

22 BY MR. RAPHAEL:

23   Q.   Okay. So I want to -- I want to be

24 clear. You have -- your testimony is that in the

25 but-for world, every member of the putative class

Page 298

1   would sign up for the play points program and use

2   their play points?

3   MS. GIULIANELLI: Objection.

4   THE WITNESS: I cannot -- this is the

5   first time I've been asked that question. I'm

6   just hearing it afresh, right? I cannot fathom

7   why a user would say, no, take back -- I was

8   going to spend a hundred dollars and I realize

9   you're trying to give me $█ , but, no, I don't

10   want the $█ , I want to spend the full hundred

11   myself. It would be crazy -- it would be crazy

12   to -- to do that.

13   BY MR. RAPHAEL:

14   Q.   Sir, in the actual world, some consumers

15   don't sign up for play points or don't use the

16   play points that they earn, correct?

17   A.   We've established, I hope, that when you

18   get two cents back on a hundred dollar purchase,

19   I'd say to myself I'm a busy dude, I don't know

20   if I'm going to sign up for this thing and go

21   through the hassle for the ███████ subsidy.

22   Q.   Right. And so your testimony is that if

23   Google changed the play points rate that you've

24   put in your report, that every member of the

25   putative class would have signed up for the play

Page 299

1   points program and used play points?

2   MS. GIULIANELLI: Objection.

3   THE WITNESS: I think -- I think it's a

4   fair assumption. Like, the model certainly is

5   not calling on this, but I think it's a fair

6   assumption that once it goes up to █ percent that

7   -- that everyone who is making purchases would

8   -- would either redeem it or at least enroll so

9   as to be able -- to be capable of taking the

10 subsidy at -- at those terms.

11 BY MR. RAPHAEL:

12   Q.   That's an assumption, though, that

13 you're making. It's not what the model tells

14 you?

15   A.   Well, the model spits out, just to be

16 clear, what the average subsidy is across all

17 users.

18   Q.   Now, you -- would you agree with me that

19 the counterfactual experiment lies at the heart

20 of antitrust analysis?

21   A.   Sure. I mean, it's an important thing.

22 It's -- I don't know if it's at the heart, but

23 you need -- you need to have a counterfactual.

24 You need to model the counterfactual.

25   Q.   Could you describe for me the

Exhibit F5
Public Redacted Version

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Exhibit 20
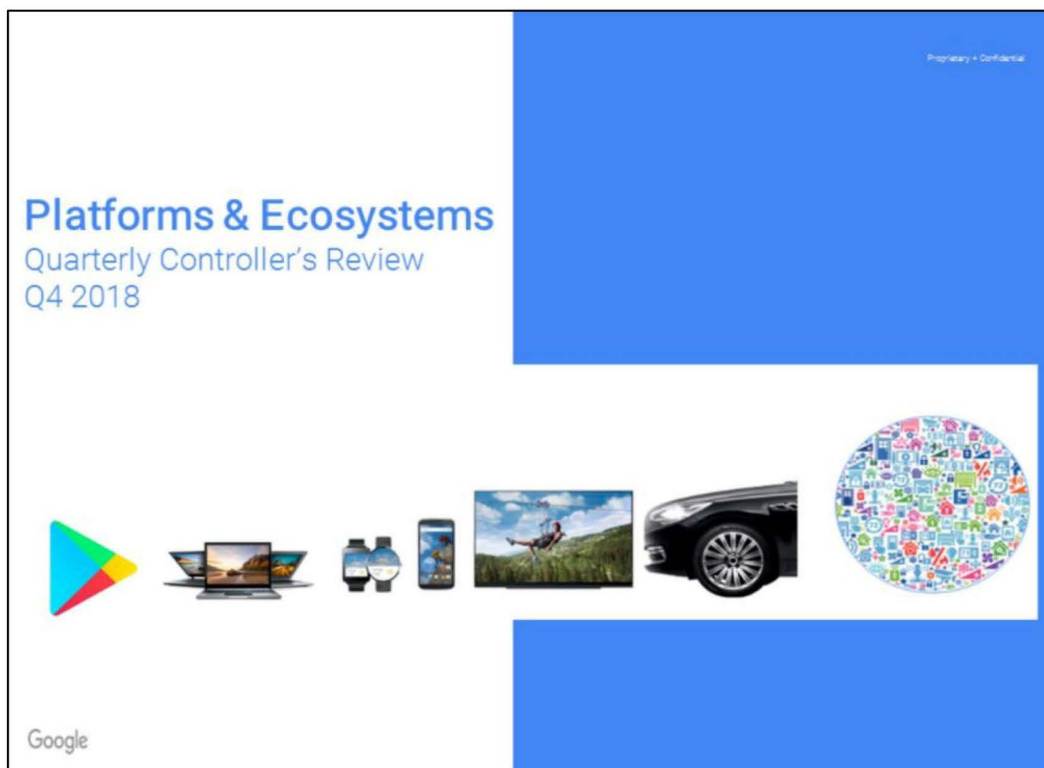
Executive Summary

Revenue Performance in FY 2018
- Expecting revenue $███████████████
- ███

Play Balance Sheet
- DSO and AR aging metrics are **green** for Carriers and Gift Card Integrators. Developers paid on time.

SOX Update
- Impacted by Google-wide processes. 1 deficiency in Cash In Transit.

Deals, Regulatory Updates
- Android - European Commission remedy
- Play - Loyalty program

Team Org Changes

Google
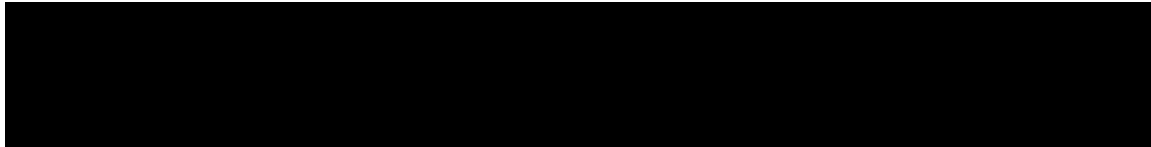
Confidential + Proprietary

Overall operating margin essentially flat to last forecast: $▮▮▮ excluding F/X and EC

millions, USD	Outlook	Plan	FvB	FoF
Net Revenue				
Core Perf. in Fixed FX				
Other/ Contra Revenue				
FX adjustments				
Direct COS				
Core Perf. in Fixed FX				
Other				
FX adjustments				
Infrastructure				
GROSS PROFIT				
Gross profit %				
TOTAL OPEX				
P&E Direct OpEx				
Payroll & SBC				
Non-Payroll				
Other EngPM				
Marketing A&P				
Sales & Marketing Allocations				
G&A Allocations				
TI Allocations				
OPERATING PROFIT				
Operating profit (excl. FX)				
OP (excl. FX & EC fine)				

Google

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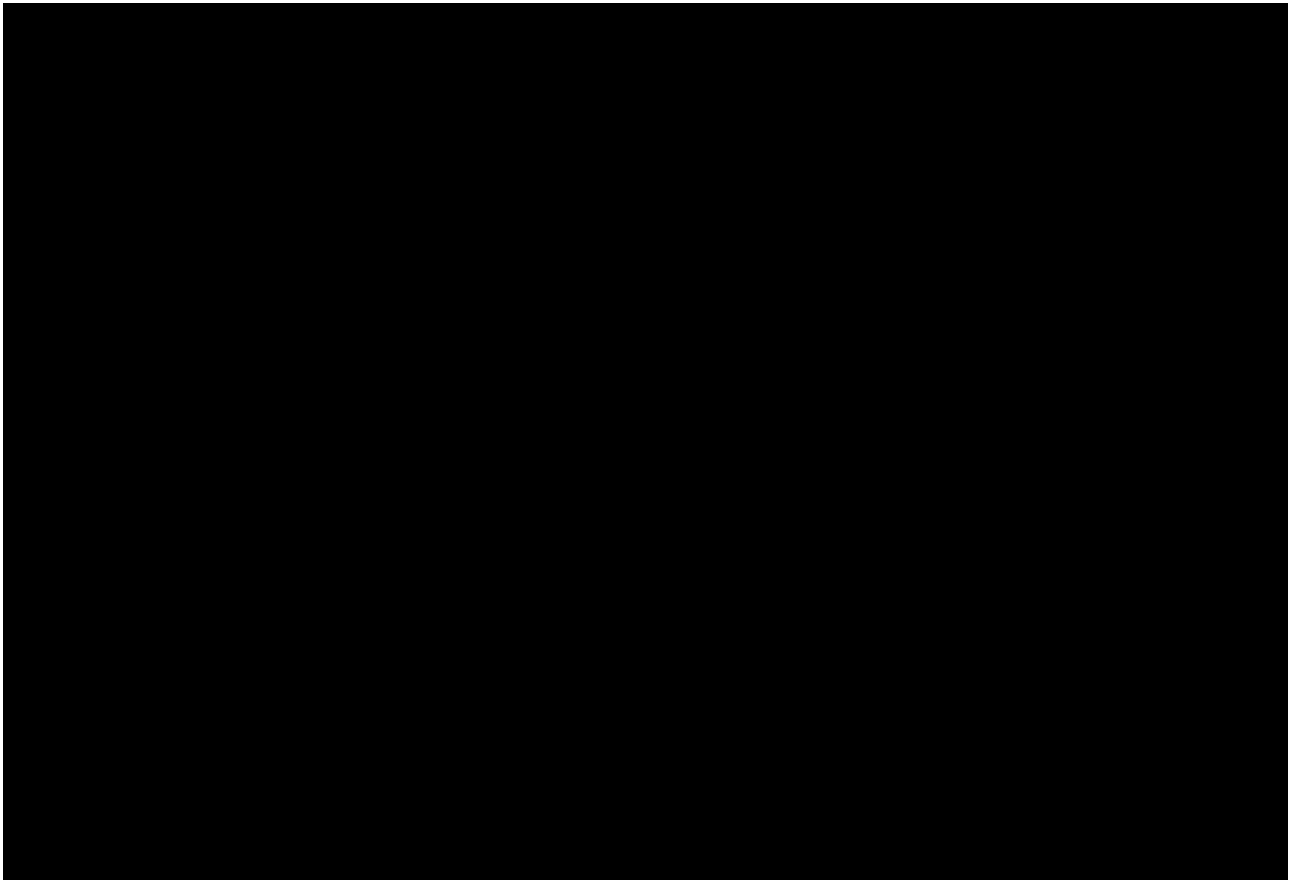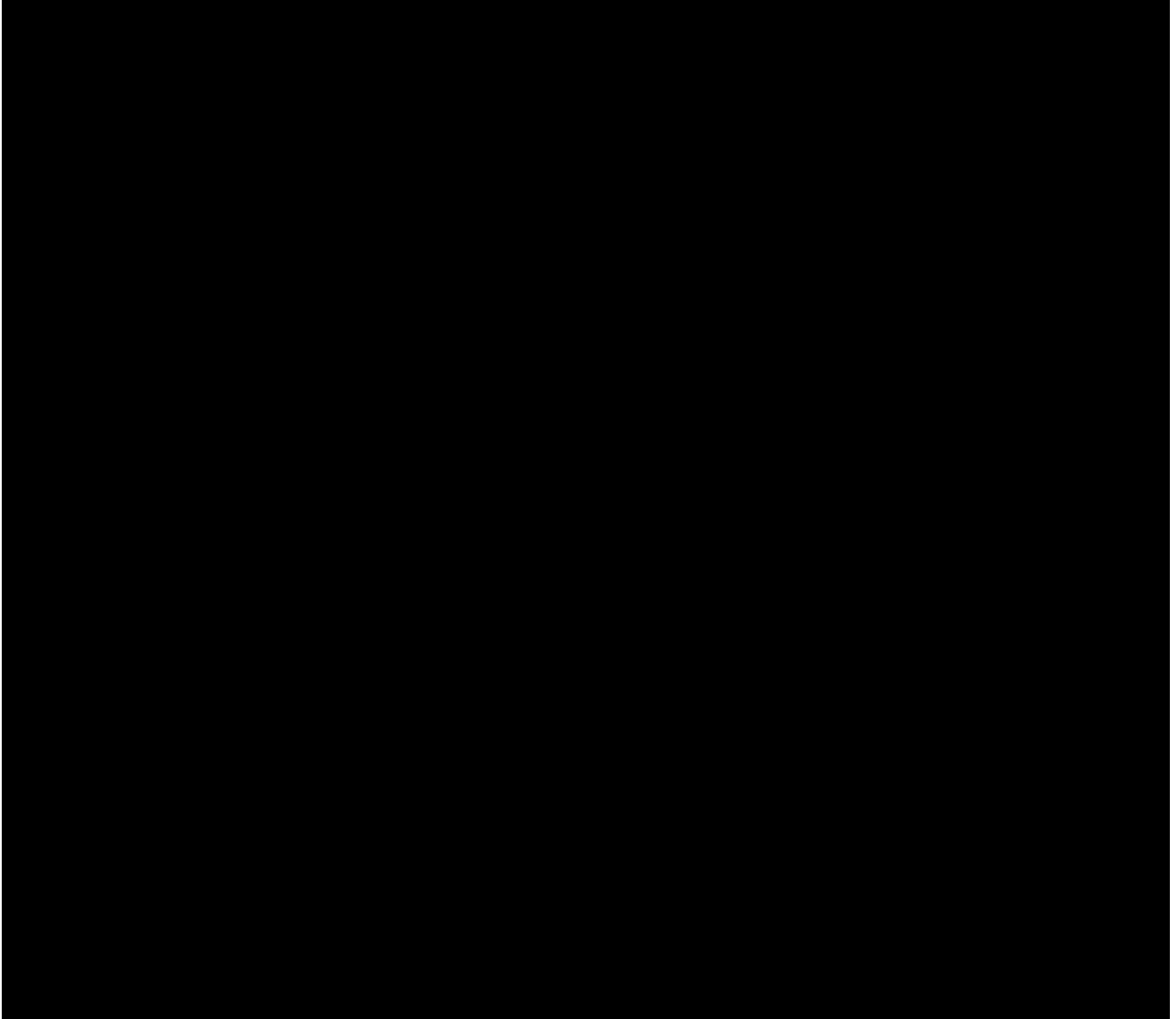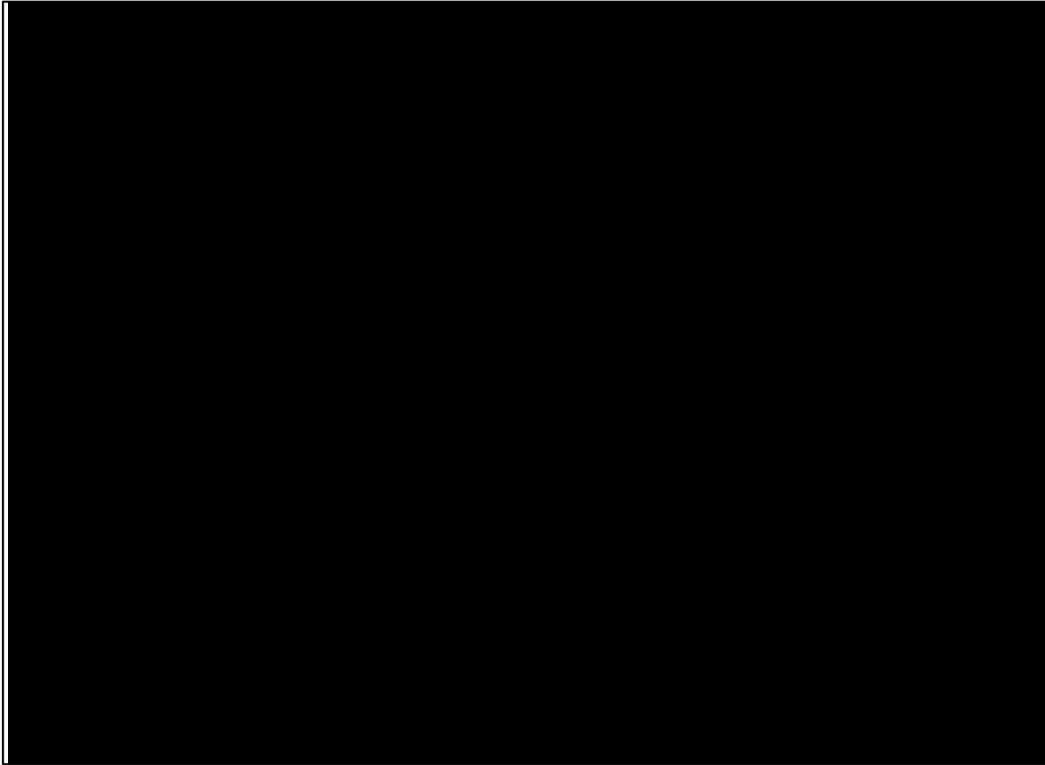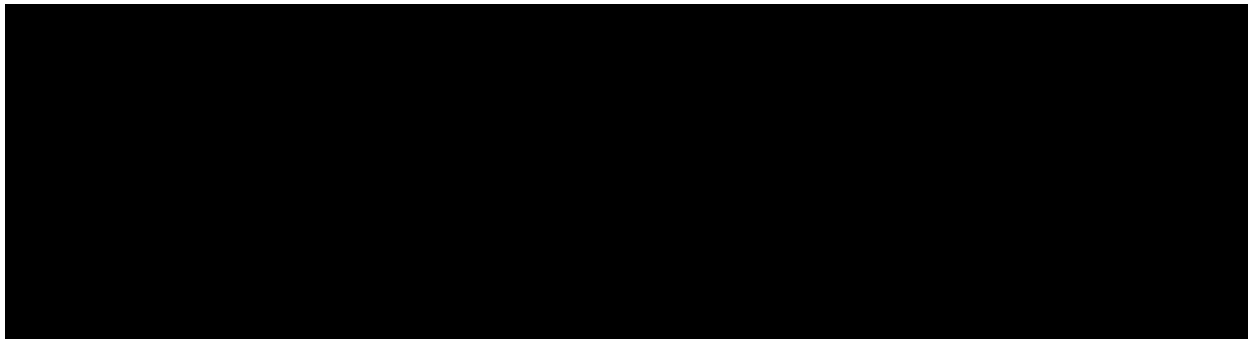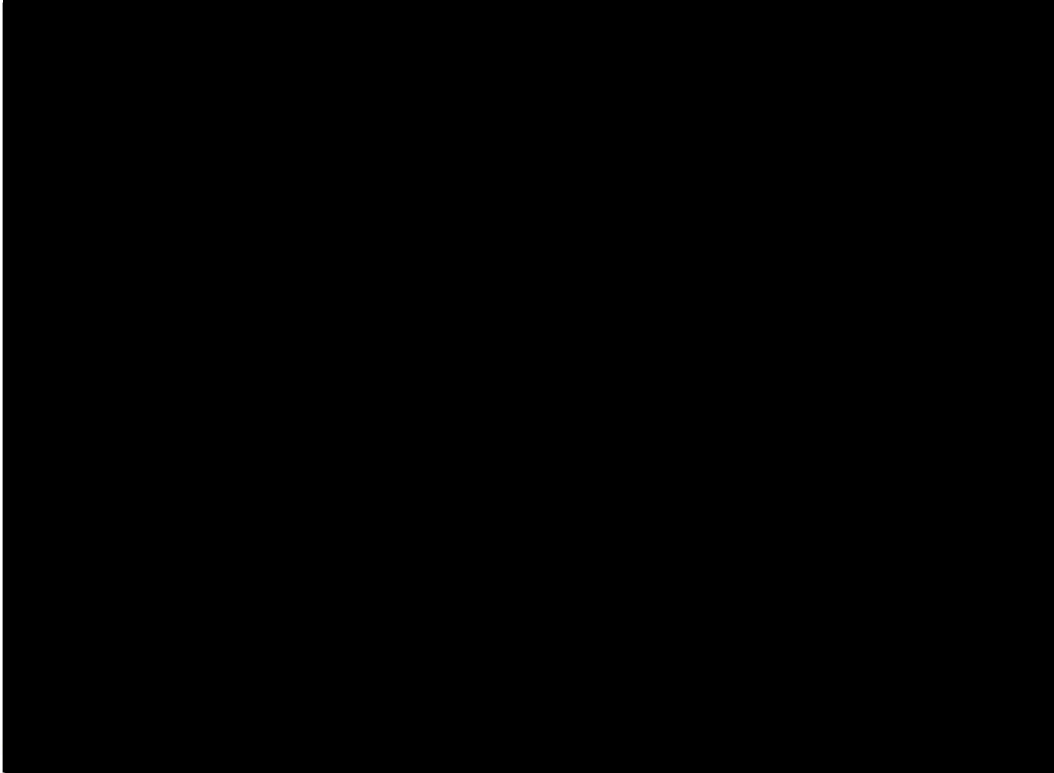
Q4 Play Key Balance Sheet Accounts Review

November 2018 (mid quarter review)

Google

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Play: Key Accounts Receivable

Mid Q4 review: Carriers & Gift Card Integrators are in good standing.

DCB Accounts Receivable

DCB AR	AR ($'M)				+60days (Oct)	DSO	
	Aug-18	Sep-18	Oct-18	MoM		Oct-18	MoM
Global							
JAPAC							
NA							
EMEA							
LATAM							

Gift Cards Receivable

Gift Card	AR ($'M)				+60days (Oct)	DSO	
	Aug-18	Sep-18	Oct-18	MoM		Oct-18	MoM
Global							
BHN							
ePay							
InComm							

Google

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- EMEA 60+ impacted by summer holidays.
- NA 60+ affected by ███████████████. Escalated the BD on the 31st of August, promise of payment received.
- JAPAC big carrier are performing well, most of late payment have been resolved.

- Gift Cards - Settlement files are received weekly and have 30 days terms

Play: Key Accounts Payable

Q4 review: Developers paid on time. ▆▆▆▆▆▆▆ Abandon Property Opportunity

Developer Payables

DPO Commerce	Target	May 2018	Jun 2018	Jul 2018	Aug 2018	Sep 2018	Oct 2018
Global	████████						

Aging Commerce	May 2018	Jun 2018	Jul 2018	Aug 2018	Sep 2018	Oct 2018
<30 Days						
30-90 Days						
90 Days+						
Total						

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Opportunity to take AUP >3 years outside the US to income.

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Becker Update
EC Android Compliance | Dec 16

Contracts and Partner Setup through Dec 18th:
- Top partners: Samsung and Huawei - in progress, following discussion at the Hong Kong summit last week.
- 479 agreements (EMADA, Placement, Search/Chrome license, Go) fully executed with 190 in progress.
- Billing set up is complete for 13 partners with 188 remaining.

Infrastructure readiness: Monetizer ready. Payments code complete. E2E (Sandbox & Prod) testing in progress; data granularity fixes underway. UAT testing in progress. Bounty statements & invoice details - design in progress.

TAC impact of Project Becker in the European Economic Area during the fee holiday period (Nov'18-Jan'19):
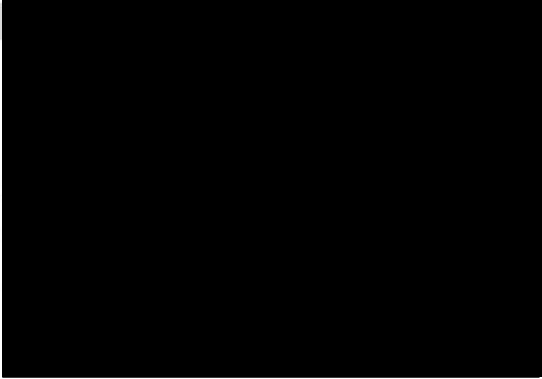- Estimate: ~$0.05M-$0.1M in Q4'18 and ~$19M-$27M in Jan'19
- Top OEMs have yet to sign EMADA, only three smaller partners have had some activations

PRIVILEGED & CONFIDENTIAL // REFLECTS EU OC ADVICE IN ONGOING COMPETITION MATTER

Google

Loyalty Points: Japan launched in Sept 2018, targeting KR, US in 2019
Objective: Improve HVU retention by deepening our relationships w/users via rewards platform

HVU spend coverage achieved earlier than expected due to rapid enrollment

- ██% in Japan consumer spend flows through Loyalty Program (as of Dec 6) with ███ enrolled members. Achieved 1 year forecasted spend coverage of ██%.

- Revenue uplift and HVU churn reduction will be analyzed in Jan, targeting ██████ of revenue uplift in Q4 2018.

- ████████████████████████████

- No noticeable differences between IFRS and US GAAP

Spend from Dune. Total consumer spend is directional due to Dune Orders bug, % of total spend under Loyalty is accurate.

Play Points is an important way we can engage and reward some of our most active Play store users (
1 point=1 c. Points liability will be relieved upon usage or expiration, whichever occurs first.
Points liability could range from ██████████ (██████% of total points issued) as we expect most buyers to use spend their points within ████████

Source:
https://docs.google.com/spreadsheets/d/16zKBahbCERt6fDwv17W0labteQ612WXpmshwiNq0o2Q/edit#gid=0
██
████████████████████

SOX Update

Google

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2018 SOX Update

Play control environment impacted by control deficiencies in Google-wide processes.
Ending year with 1 control deficiency with CIT. Credit Cards process is under evaluation.

SOX Controls open issues:

- Credit Cards process design - still under evaluation. Booked $24M in under accrued credit card fees in Q4.
- Cash in Transit system design issue in B3 impacting multiple products areas.

SOX Resources: hired, staffed for 2019

- 2 FTE granted (1 by Business, 1 by Finance) and hired. 1 started in November, 1 start in January.

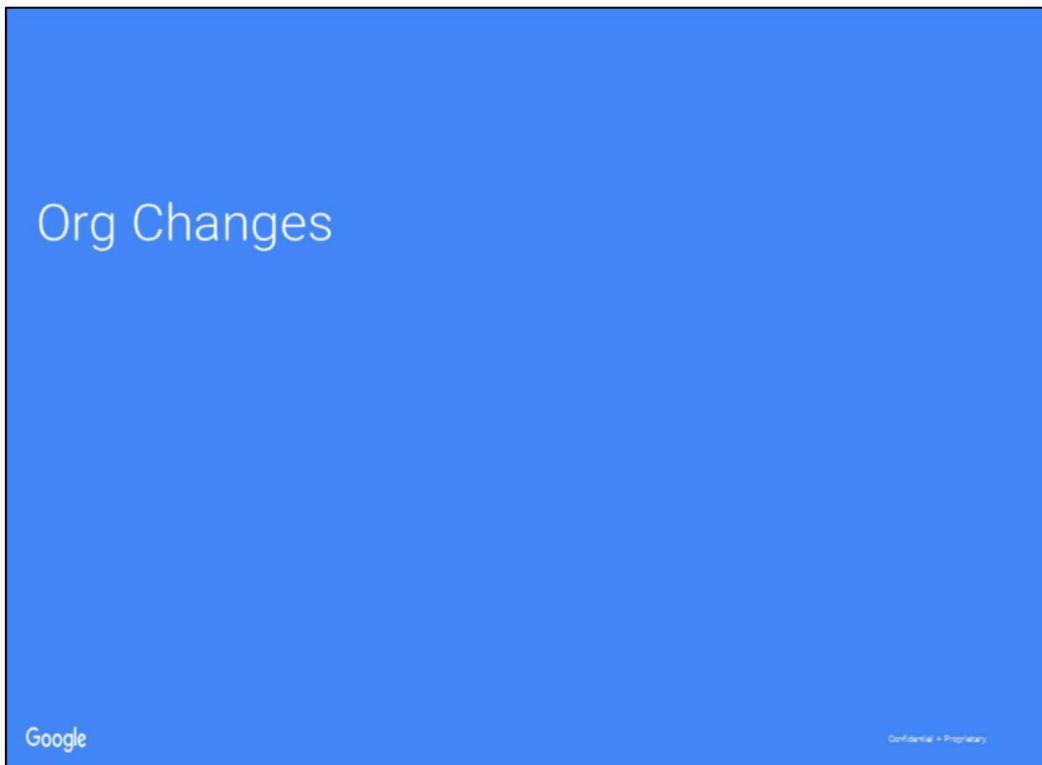14

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Remediated, closed:
Deficiency identified (fully remediated as of year end - memo) in the Play OTC process, where orders were charged without delivering to the user. < 6 Million USD impact in one sided user refunds.
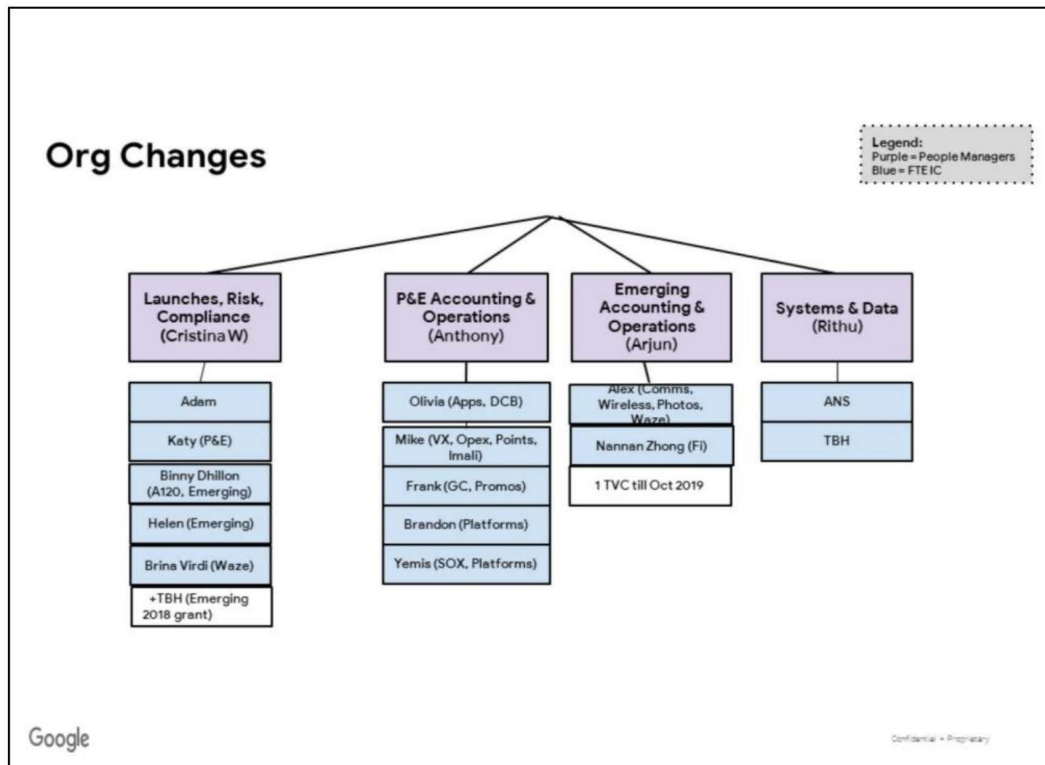
Q2 Geo Disclosure Reporting error:

Play Apps revenue was coded to the buyer location for Merchant of Record (MoR) transactions instead of the seller location which caused data discrepanc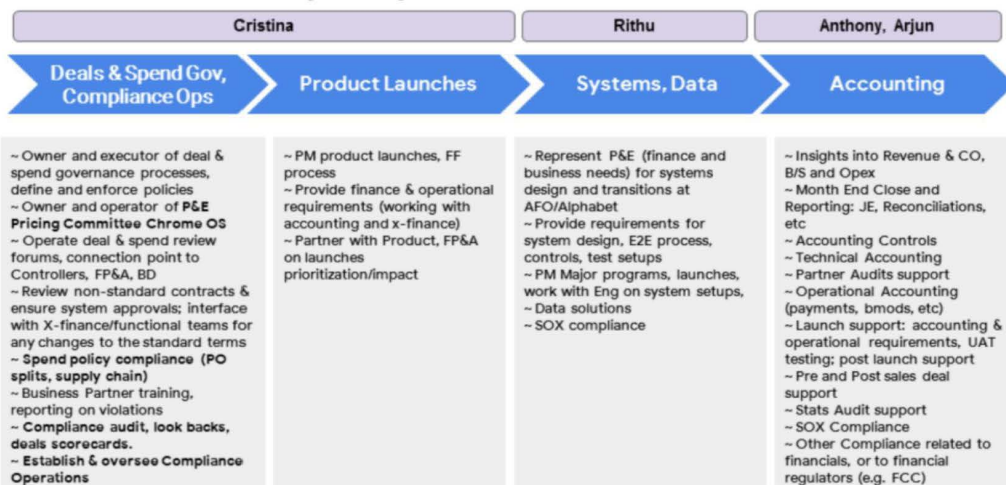ies in the Revenue by Geo disclosure in our 10Q in Q2, 2018. Payments Engineering supporting an intermediary reporting fix for Q1 2019. Validation in-progress.

Play Controllership team has build an interim solution to support geo reporting from alternate SOX compliant source in the interim (Q4). Solution vetted with key stakeholders. Post Mortem

P&E Controllership Responsibilities

Cristina		Rithu	Anthony, Arjun
Deals & Spend Gov, Compliance Ops	**Product Launches**	**Systems, Data**	**Accounting**
~ Owner and executor of deal & spend governance processes, define and enforce policies ~ Owner and operator of **P&E Pricing Committee Chrome OS** ~ Operate deal & spend review forums, connection point to Controllers, FP&A, BD ~ Review non-standard contracts & ensure system approvals; interface with X-finance/functional teams for any changes to the standard terms ~ **Spend policy compliance (PO splits, supply chain)** ~ Business Partner training, reporting on violations ~ **Compliance audit, look backs, deals scorecards.** ~ **Establish & oversee Compliance Operations**	~ PM product launches, FF process ~ Provide finance & operational requirements (working with accounting and x-finance) ~ Partner with Product, FP&A on launches prioritization/impact	~ Represent P&E (finance and business needs) for systems design and transitions at AFO/Alphabet ~ Provide requirements for system design, E2E process, controls, test setups ~ PM Major programs, launches, work with Eng on system setups, ~ Data solutions ~ SOX compliance	~ Insights into Revenue & CO, B/S and Opex ~ Month End Close and Reporting: JE, Reconciliations, etc ~ Accounting Controls ~ Technical Accounting ~ Partner Audits support ~ Operational Accounting (payments, bmods, etc) ~ Launch support: accounting & operational requirements, UAT testing; post launch support ~ Pre and Post sales deal support ~ Stats Audit support ~ SOX Compliance ~ Other Compliance related to financials, or to financial regulators (e.g. FCC)

Full year forecast and variance to budget by PA

		Platforms						Play	
		Outlook	FvB	Outlook	FvB	Outlook	FvB	Outlook	FvB
millions, USD		Android	Android	ChromeOS	ChromeOS	Chrome	Chrome	Play	Play
Net Revenue									
Core Perf. Revenue in Fixed FX									
Other/ Contra Revenue									
FX adjustments									
Direct COS									
Core Perf. Revenue in Fixed FX									
Other									
FX adjustments									
Infrastructure									
GROSS PROFIT									
TOTAL OPEX									
Direct OpEx									
Payroll & SBC									
Non-Payroll									
Other EngPM									
Consumer Marketing A&P									
Sales & Marketing Allocations									
G&A Allocations									
TI Allocations									
OPERATING PROFIT									
OP %									

Google

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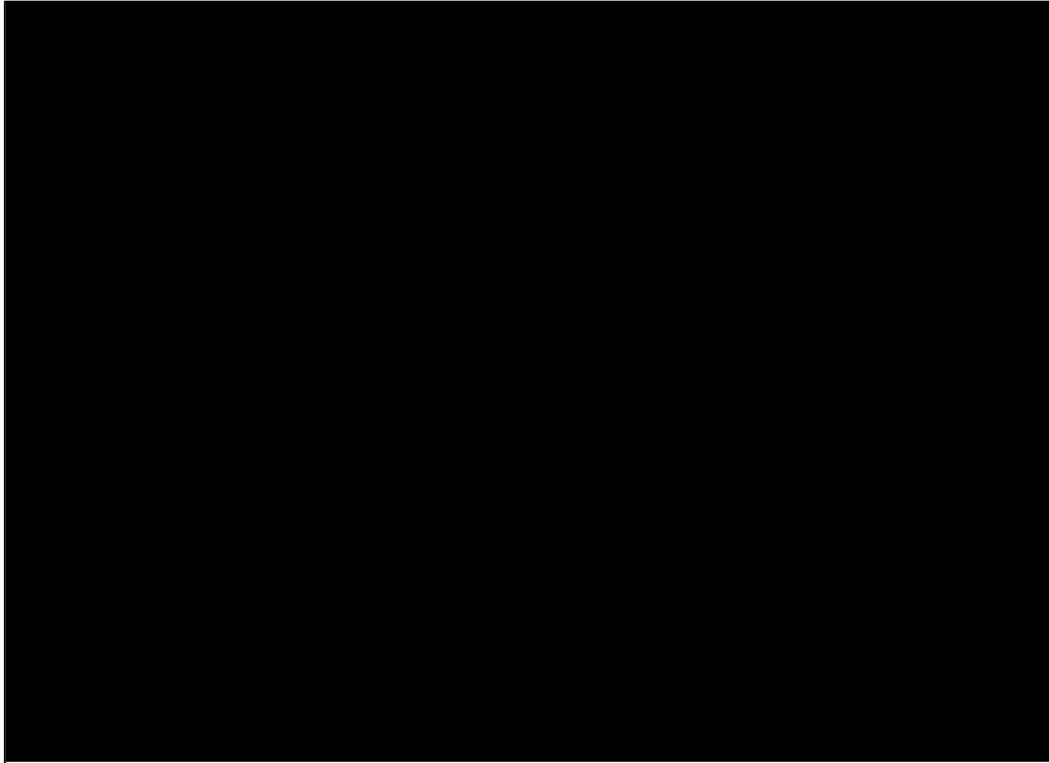
4Q P&E P&L: Expected to land ahead of target
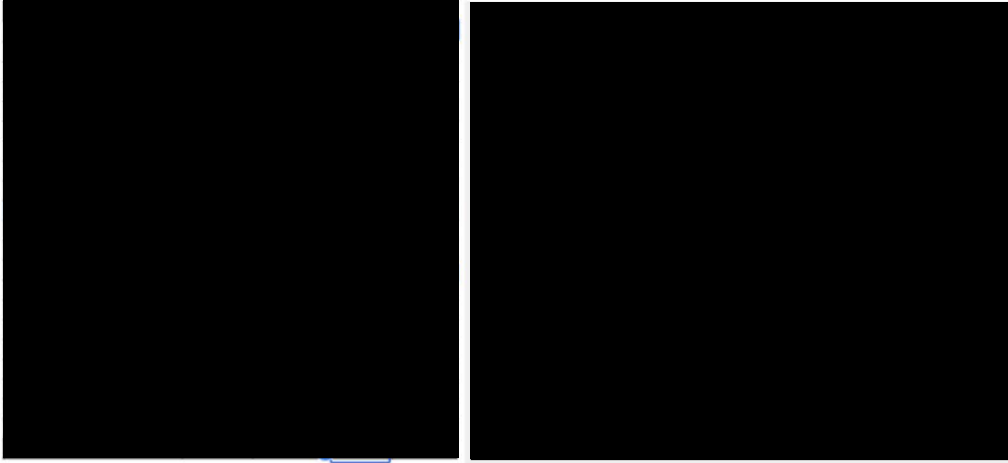
Google

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Speaker notes:
https://docs.google.com/document/d/1ACcAGHjPF8hEZq5mttQvQX5BdSi18lM
zBxzgotUC7YQ/edit?hl=en

Did you know:
███████████ █ ██
Tinder – #1 Grossing title by spend in 16 countries (incl. GB, CA, IN)

██
██
██████████████████████████████████

LiveOps – Over 100 LiveOps spotlights with 75 expected in Q2 (+76% vs Q1); 370+ LiveOps Card events surfaced for 36 developers; $30M+ estimated consumer spend uplift for H1 titles, +4% avg engagement uplift, ~20% avg featuring impact

Spring deal promotion – Ran successful Spring Deals promotion ████████
██
███████████████████████████████████.

Accounting & Operational Considerations:
Points program will have both P&L and balance sheet impacts

1. Points are considered a <u>material right</u> to the end user for accounting purposes, which generates a performance obligation from Google to the user for future purchases and requires revenue deferral for purchases

2. Program will require the recognition of a points liability on the balance sheet (not deferred revenue) for the <u>relative fair value</u> of loyalty points based on the initial sale transaction

3. Points liability will be relieved upon usage or expiration, whichever occurs first. Points liability could range from ▓▓▓▓▓ (▓▓▓% of total points issued) as we expect most buyers to use spend their points within 2 months

4. Accounting will be manual initially, based on the system reporting. Need to have enough historical data to build the model for automation.

*On apps and games. Slight margin difference exist for digital content

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- When points are spent, a portion of the deferred revenue release must be allocated to Revenue and/or Contra Revenue based on what the end user purchases.
- A&G point spend = Revenue + Contra Revenue (developer payout in excess of standard ~70% rev share)
- VX point spend = Revenue
- A material right is an option for free or discounted future goods & services that the customer would not receive without entering into the contract. In effect, the customer pays the entity in advance for future goods or services, and the entity recognizes revenue when those future goods or services are transferred or when the option expires.
- Over time, for every 100 points ($1 value) earned and spent*, Google forgoes $▓ in margin.
- We expect that for a single country, the liability at the end of year 1 could range from $▓▓ to $▓▓▓. Similar to monetary promos, we expect users to spend their points fairly quickly, so at the end of the year, unspent points could range from ▓▓▓% of total points earned during the year ($▓▓▓ total points earned in year 1).

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Play Books - Project Platinum
Objective: Pursue self-publishing market again through simplified rev share structure
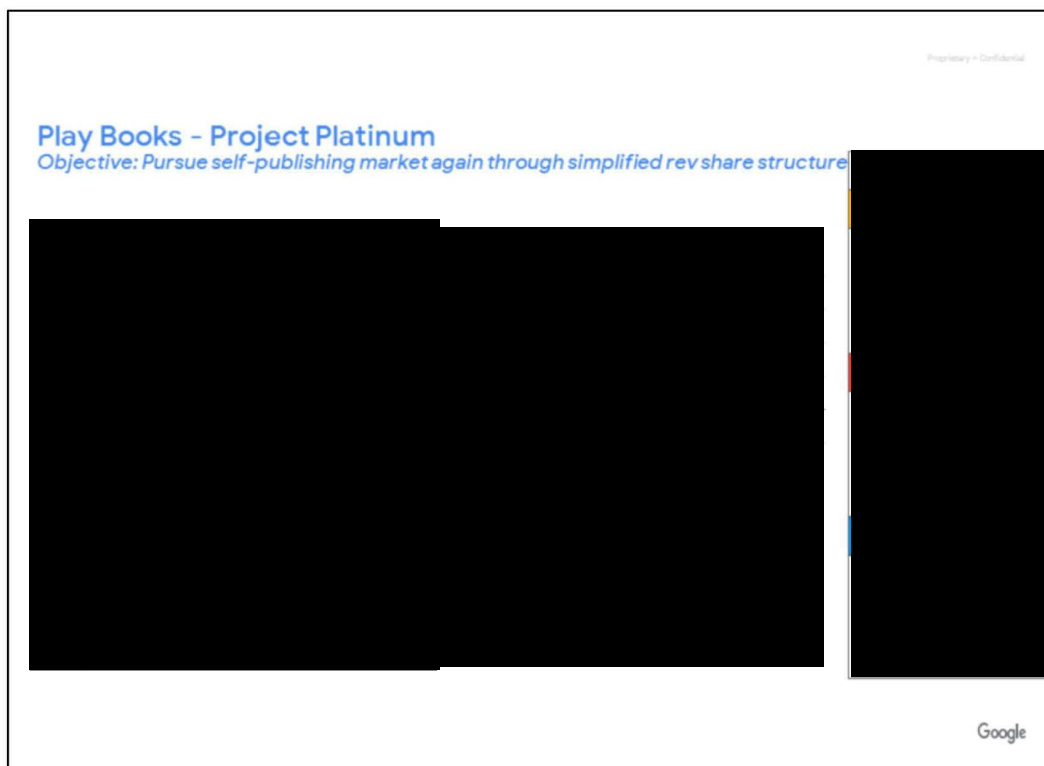
Google

GOOG-PLAY-000004981.R

Exhibit F8

Public Redacted Version

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Exhibit 19